Engineering Evaluation/Cost Analysis Report Greiner's Lagoon Site Fremont, Ohio

EE/CA REPORT

Volume 2 of 2

Revised May 2001

09928.00.01

Submitted to

U.S. EPA, Region V

77 W. Jackson Street

Chicago, Illinois 60604

Submitted by

The Lubrizol Corporation

29400 Lakeland Boulevard

Wickliffe, Ohio 44092-2298

Environmental Resources Management 355 East Campus View Columbus, Ohio 43235



Appendices

Appendix A Boring/Monitoring Well Logs

Stabilized Material Soil Borings



Boring /Monitoring Well Log

Page 1 of __1__

Clien	t:		(614) 433-7300			WO#: 09928.00.01 Boring/Well I.D.: SM-1				
roje	ct:		brizol Corpora		<u> </u>	Well Construction Data				
Date	Starte	d·	zed Material Ir	Date Comp		Screen:				
L	ed By:	4/9/		Checked By	4/9/90	N/A Pack: N/A	From:	To:		
		. D. 1 JK	AGT	Driller	D. DENIKO	N/A	From:	To:		
Meth	od:	PHILII	PENV.	ST Equipment:	EVE SNIEDER	Grout:	From:	To:		
- 1	g Dept	HSA	······································		CME face Elevation:	Inner Casing:	From:	To:		
L	GW L		·t.	GW Level:	Time/Date	N/A				
	1	1	<u> </u>	277 2070	1	Outer Casing/Stick Up: N/A	 			
Depth	Sample Type	Sample ID.	Blow Counts	Headspace (ppm)	Desc	ription	Remarks	Well Construction		
V 0	SS-1 ST-1	1'-3'	Shelby Tube		0-5' FILL: Silty sand v gravel, gray-brown, n					
-	SS-2	3'-5'	2-4-8-10	>1000			_			
5-	SS-3	5'- 7 '	8-10-12-28	>1000	5'-20' FILL: Silty sand moist to wet, strong h	w/clay, stained black, ydrocarbon/solvent odor				
	SS-4	7'-9'	9-4-4-5	NR	Water, very oily, @ 7'	-				
10	ST-2	9'-11'	Shelby Tube							
<u>-</u> -	! !	13'-15'		>1000			- -			
15	SS-6	15'-1 <i>7</i> '	4-8-1221	>1000		1		i		
-	SS-7	1 7 '-19'	4-7-21-22	>1000			_ 			
	SS-8	19'-21'	5-9-6-4	>1000			-			
20	SS-9	21'-23'	10-20-20-20	540	20'-23' NATIVE SOI moist	L: Silty clay, gray-brown,				
25							- - - -			
30-						·	-			



Boring /Monitoring Well Log

Page 1 of 1

	KIVI		(614) 433-7900			rage for				
Clien	nt:	Lul	brizol Corpora	tion		WO#: 09928.00.01 Boring/Well I.D.: SM-2				
[/] roje	ct:	Stabili	zed Material Ir	vestigation	n	Well C	onstruc	tion Data		
Date	Starte	d: 4/10	/96	Date Compl	4/10/90	Screen: N/A		From:	То:	
Logg	ed By:	S. DR	AGT	Checked By	D. DENIRO	Pack: N/A		From:	То:	
Drillir	ng Co.:	PHILII	PENV.	Driller:	EVE SNIEDER	Seal: N/A		From:	To:	
Meth	od:	HSA		Equipment:		Grout: N/A	<u>Z</u>	From:	To:	
Borin	g Dep	th: 25 f	ft.	Ground Sur	face Elevation:	Inner Casing: N/A		-		
Initial	GW L	evel:		GW Level:	Time/Date	Outer Casing/Stick Up: N/A		<u>-</u>		
Depth	Sample	Sample ID.	Blow Counts	Headspace (ppm)	Descr	ription	Rem	narks	Well Construction	
			·					_		
] :	ST-1	2'-4'	Shelby Tube	ļ				4		
-	SS-1	3'-5'	5-11-11-13	>1000	3'-5' FILL: Silty clay w gravel, gray-brown, m			-		
5-	SS-2	5'-7'	50/2	>1000	Spoon refusal on a pie 5'-16' FILL: Debris con			-		
) - [-	SS-3	7'-9'	2-2-4-8	600		tained black, moist to wet,		4	·	
10-	ST-2	9'-11'	Shelby Tube					- 		
۔ ۔ ب	SS-4	13'-15'	12-3-5-7	NR				- - -		
15-	SS-5	15'-17'	7-20-20-25	>1000						
-	SS-6	1 7 '-19'	5-11-21-19	>1000	16'-21' FILL/NATIVE S black, saturated w/oil	SOIL: Silty clay, stained , strong odor		-		
20	SS-7	19'-21'	8-8-11-3	640						
-	SS-8	21'-23'	15-20-18-17	NR	21'-25 NATIVE SOIL: moist	Silty clay, grat-brown,				
-	SS-9	23'-25	2-12-10-11	380				-		
25-										
· -								_		
j -					·					
30-						-	•			



Boring /Monitoring Well Log

Page 1 of __1___

	16141		(614) 435-7900						
Com		Lu	brizol Corpora	ition		WO# 09928.00.01 Boring/Well			I.D.: SM-3
المرد			zed Material Ir	nvestigation	n	Well	Constru	ction Data	
Date	Starte	d: 4/11	1/%	Date Compl	leted: 4/11/96	Screen N/A		From:	To:
Logg	ed By			Checked By		Pack. N/A	88	From:	To:
Drillia	ng Co.	PHILI	P ENV.	Driller: ST	EVE SNIEDER	Seal. N/A		From:	To:
Mot	od:	HSA		Equipment.		Grout: N/A	2	From:	To:
Borir	ng Dep	en: 25	ft.	Ground Sur	face Elevation:	Inner Casing: N/A			
	GW			GW Level	Time/Date	Outer Casing/Stick Up: N/A			
		ء							
60	ack!	Semple 13	Blow Courts	Headspace (ppm)	Des	cription	Re	marks	Well Construction
0-	-	ļ							
•	ST-1	1'-3'	Shelby Tube					-	
] SS-1	2.5]	
-	33-1	3:-5	5-9-13-17	>1000	3'-5' - Silt, trace grav	el, dry		_	
5-	SS-2	5-7	3-5-8-12	>1000	5'-13' - Silty clay, pie			_	
•					trace sand, gray blac soft, moist	ck w/ beige,		-	
	SS-3	7-9	1-1-1-1	>1000]	
-	ST-2	9-11	Shelby Tube					4	
10-	-				 - -			\dashv	
•	SS-4	11'-13'	2-3-7-12	>1000				7	
-	- 55-5	13'-15'	1-2-1-1	>1000	12:17: 61 ::1:1	1 1 2 2 4 4 1 m]	
-			1-2-1-1	>1000	13'-17' - Sandy silt, b	lack, moist to dry		4	
15—	· SS-6	15-17	6-15-15-19	>1000				\dashv	
-	· 55-7	17-19	6-12-20-14	820	17-25 NATIVE SOIl oil covered, moist	L. Silty clay, gray-brown,		-	
-	· ~~ ^	.~							
20-	<i>3</i> 3~₹	19-21	9-12-15-15	420					
-	SS-9	21'-23'	8- 9 -12-11	220	some stained band	dimg @ 21		4	; ;
-	•							+	
_	•								
- 25—	55-10	25-27	2 -4-6-9	22	no stained bands	s @ 25'		_]	
-		<i>-U</i>	6 TV7			· 		_	
-	•							-	İ
-	•							-	
- 	,							_	
v								_	



Boring /Monitoring Well Log

Page 1 of 1

	V IAI		(614) 433-7900							90 101
Clien		Lui	brizol Corpora	tion		WO#: 09928.00.01 Boring/Well i.D.: SM-4			. D .: SM-4	
roje	ct:	Stabili	zed Material Ir	vestigation	n		Constr	uction Da	ıta	
Date	Starte	d: 4/11	1/96	Date Comp	leted: 4/11/96	Screen: N/A	E	Fro	m:	То:
	ed By:	3. DK	AGT	Checked By	y: D. DENIRO	Pack: N/A	ૄ	Fro	m:	To:
Drillir	ng Co.:	PHILII	P ENV.	Driller	EVE SNIEDER	Seal: N/A		Fro	m:	То:
Meth	od:	HSA		Equipment:	СМЕ	Grout: N/A	2	Fro	m:	То:
Borin	g Dept	th: 30 i	ft.	Ground Sur	face Elevation:	Inner Casing: N/A				
Initial	GW L	evel:		GW Level:	Time/Date	Outer Casing/Stick Up: N/A				
Depth	Sample Type	Sample ID.	Blow Counts	Headspace (ppm)	Desc	ription	R	emarks		Well Construction
_/0-										
-	ST-1	1'-3'	Shelby Tube						-	
-	SS-1	3'-5'	3-5-3-4	>1000	3'-5' - Silt, trace gravel	l, brown, dry			4	
5-	SS-2	5'- <i>7</i> '	2-4-12-8	>1000	5'-13' - Silty clay, som material and compres	sed wood or			4	
, - 1 -	SS-3	7'-9'	1-2-3-4	>1000	paper, oil stained , mo	oist			4	
10-	1	9'-11'	Shelby Tube						4	
-	SS-4	11'-13'	5-7-8-11	>1000	increasing sand con	itent, gray-green @ 11'			1	
_ • •	SS-5	13'-15'	2-2-7-8	>1000	13'-19' - Sandy silt, bla Water @ 14'	ack, moist to wet			4	
15	SS-6	15'-1 <i>7</i> '	18-13-18-24	>1000	Water & 14				4	
-	SS-7	1 7 '-19'	17-31-18-24	NR	,				1	
20-	SS-8	19'-21'	7-23-26-19	540	19'-30' NATIVE SOIL: oil covered, wet	Silty clay, gray-brown,			4	
-	SS-9	21'-23'	4-6-12-13	420	some stained bandi	img @ 21'			1	
-									4	
25— -	SS-10	25'-27'	3-7-7-5	140	no stained bands	@ 25'			-	
l -									4	
30—	SS-11	30'-32'	2-6-6-8	8.5					4	
		i		,		İ			- 1	



355 EAST CAMPUS VIEW SUITE 250 COLUMBUS OHO

Boring /Monitoring Well Log

Page 1 of __1__

	VIAI		-614: 433-7900			- 		. ugo . u
Chen		Lul	brizol Corpora	tion		WO# 09928.00.01	Well I.D.: SM-5	
Proje	at T	Stabili	zed Material Ir			Well C	Construction D	ata
Date	Starte	d: 4/10)/%		leted: 4/10/96	Screen: N/A	Fre	om: To:
Logg	ed By:	S. DR	AGT	Checked By	D. DENIRO	Pack: N/A	Fn	om: To:
Onition	g Co:	PHILI	P ENV.	Oritler	EVE SNIEDER	Seal: N/A	Fre	om: To:
Meth	-	HSA		Equipment	CME	Grout: N/A	S Fr	om: To:
Bonn	g Dept	ht 22 f	ft.	Ground Sur	face Elevation:	Inner Casing: N/A		
nea	GW L	evet:		GW Level	Time/Date	Outer Casing/Stick Up: N/A		
Depth	Bemple 1ype	Semple (D	Blow Counts	Headepace (ppm)	Des	cription	Remarks	Well Construction
0— - - 5—	ST-1 SS-1 SS-2	4'-5'	Shelby Tube 5-9-9-11 4-6-9-9	60 >1000	4'-11' FILL: Silty cla orange-brown striat wet, strong odor			
-	SS-3 ST-2	7-9 9-11	3-25-21-18 Shelby Tube	>1000	Water @ approx. 7"			
10- - -		11'-13'	5-15-10-12 10-12-11-15	>1000	11'-20' NATIVE SOIL orange-brown striation			
20— - - 20— - - - - -	SS-6	15-17	!	>1000 180				
30 —								_



Boring /Monitoring Well Log

Page 1 of __1___

	TATAT		(614) 433-7900	 		lura:			
Clien		Lul	orizol Corpora	tion		WO#: 09928.00.01 Boring/Well I.D. : SM-6			
roje	ct:	Stabiliz	zed Material Ir	vestigation	1	-1	Constru	ction Data	
1	Starte	4/10	/96	4	eted: 4/10/96	Screen: N/A		From:	To:
	ed By:	. J. 1 / K	AGT	Checked By	D. DENIRO	Pack: N/A	**	From:	To:
Drillir	g Co.:	PHILII	PENV.	Driller: ST	EVE SNIEDER	Seal: N/A		From:	То:
Metri	ou:	HSA		Equipment:	CME	Grout: N/A	Z	From:	То:
Borin	g Dep	th: 22 f	t.	Ground Sur	face Elevation:	Inner Casing: N/A		···	
Initial	GW L	evel:	·	GW Level:	Time/Date	Outer Casing/Stick Up: N/A	-		
Depth	Sample Type	Sample ID.	Blow Counts	Headspace (ppm)	Desc	ription	Re	marks	Well Construction
 -e-									
-	ST-1	1'-3'	Shelby Tube					-	
-	SS-1	3'-5'	2-3-6-10	>1000	3'-14' FILL: Silty clay, moist to saturated, st			-	
5-	SS-2	5'-7'	7-9-12-13	>1000	Water @ 6.5'				
) - [-	SS-3	7'-9'	16-17-16-19	>1000	Water & 0.5			† -	
10-			Shelby Tube					<u> </u>	
-		11'-13'		660				†	
- 	SS-5	13'-15'	3-5-7-13	74				4	
15-	SS-6	15'-17'	2-3-6-7	60	14'-22' NATIVE SOIL: wet	Silty clay, gray-brown,		-	
-								-	
20—	SS-7	20'-22'	4-5-6-10	9.5				4	
-						;		1	
25-		·							
-								4	
· _ 1´ -				 				-	
30-								4	



356 EAST CAMPUS VIEW SUITE 250 COLUMBUS, OHIO

Boring /Monitoring Well Log

Page 1 of __1_

	KM		(614) 433-7900				7			ge 101
Chen		Lul	brizol Corpora	ition			WO# 09928.00	.01	Boring/Well	I.D.: SM-7
roje	ct	Stabili	zed Material Ir	vestigation	n			Well Const	ruction Data	
Date	Starte	₫: 4/11	/%	Date Comp	leted 4/11 '9		Screen N/A		From:	To:
Logg	ed By:			Checked B	D DENIR	ວ	Pack: N/A		From:	To:
Drillen	ng Co.:		P ENV.	Driller-	EVE SNIEDE		Seal N/A		From:	To:
Moth		HSA		Equipment:			Grout: N/A		From:	To:
Bonn	g Dept			Ground Sur	face Elevation:		Inner Casing: N/A			
inital	GW L			GW Level:	Time t	Date	Outer Casing/Stick U			
-	T	T_	Τ				<u> </u>		<u> </u>	
E C	Semple Type	Semple (C)	Stow Counts	Headspace (PPm)		Desc	niption	ş	Remarks	Well Construction
0			G]				-	
_	ST-1	13.	Shelby Tube]	
_	SS-1	3-5	3-4-6-8	>1000	3'.5' . 5311	lav w / en	e sand, stained		4	
-			3100	>1000	black, dry t		e said, stanted		4	
5-	ST-2	5.7	Shelby Tube						-	
		-~			ľ				=	
′ -	35-2	7-9	3-14-16-14	>1000	7-9 - Silty s green bands		clay, stained black,]	
_	SS-3	9-11	+14-14-11	240					4	
10—					9'-17' - Silty moist to we		ıl soil), grey-black,		4	
-	SS-4	11 -13	7-8 -11-15	12		., 0201.			-	
-	oc :	15-17		12						
	33-3	13-17]	
15—									_	
٦				}					-	
-					<u> </u> -				4	
]	
20—										
-					1				4	
-									4	
_									4	
- 25—										
 -									-	
4									4	
4									4	
_	cc ,	30. 33.	2440	ه د					+	
30—	DD-11	30 -32	2-6-6-8	8.5					\neg	



Boring /Monitoring Well Log

Page 1 of __1_

	Client:					WO#: 09928 00 01 Paring Mall D : CM 8				
<u> </u>			brizol Corpora			09925.00.01 Boiling/Well I.D.: 5M-6				
roje			zed Material Ir	vestigation	1	L	Construct	ion Data		
	Starte	4/11	/96	Date Comp	leted: 4/11/96	Screen: N/A		From:	To:	
	ed By:	. D. I J K	AGT	Checked By	^{/:} D. DENIRO	Pack: N/A		From:	То:	
Drillin	ng Co.:	PHILII	PENV.		EVE SNIEDER	Seal: N/A		From:	То:	
ונוטועו	ou.]	HSA		Equipment:	CME	Grout: N/A	<i>Z</i> Z	From:	То:	
Borin	g Dept	^{h:} 15 i	ft.		face Elevation:	inner Casing: N/A				
Initial	GW L	evel:		GW Level:	Time/Date	Outer Casing/Stick Up: N/A				
Depth	Sample Type	Sample ID.	Blow Counts	Headspace (ppm)	Desc	ription	Rema	arks	Well Construction	
 o_										
	ST-1	1'-3'	Shelby Tube					- - -		
-	SS-1		1-1-2-3	>1000	3'-5' - Silt clay, stained moist	black, odor,		† †		
٦, -	ST-2		Shelby Tube							
<u> </u>	SS-2		2-12-18-22	>1000	7'-11' - Silty sand, some green bands, moist, str					
10-	55-3	9'-11'	4-12-13-15	>1000	Water @ 9'			4		
-		11'-13'		300	11'-17' - Silty clay(natu moist to wet, odor.	ral soil), grey-black,		- 		
۔ ا ۔ سا	SS-5	13'-15']		
15-	SS-6	15'-1 <i>7</i> '	4-11-9-7					4		
-					·			4		
20—								4		
-								1		
25—								_		
-								4		
- 1 -								† †		
30-	SS-11	30'-32'	2-6-6-8	8.5				\dashv		



Boring /Monitoring Well Log

Page 1 of __1___

Chen	t .	f	brigal Carnors	tion		WO# 09928.00.01 Be		Boring/Well	Boring/Well I.D.: SM-9	
Plote	ct		brizol Corpora zed Material Ir	-	1		II Const	ruction Data		
Date	Starte	#		Date Comp	leted: 4/12/96	Screen	00:101	From:	To:	
Logg	ed By	4/12 S. DR			D. DENIRO	N/A Pack: N/A	E	From:	To:	
			P ENV.	Driller		Seal: N/A			To:	
Motiv	od:	PHIUI	PENV.	Equipment:	EVE SNIEDER	Grout	<u>I</u>	From:		
		HSA n: 121	·	L	CME face Elevation:	Inner Casing:	8	From:	To:	
_	GW L		n.	GW Level:	Time/Date	N/A				
		1			1	Outer Casing/Stick Up: N/	/A			
Depth	Bemple 7 ype	Semple ()	Blow Courts	Headepace (mild)	Desc	cription	F	lemarks	Well Construction	
0-	ST-1	0-2	Shelby Tube					_		
	ST-2	2'-4'	Shelby Tube]		
5-	1	4'-6'	2-2- 6-9	2	4'-6' - Silty clay, some moist to wet.	e sand, orange-brown,]		
		6-8	0-0-1-2	58	6'-10' - Silty sand, trac	e clay, gray-black, wet.		4		
, - 1	1	}			•	, 0 ,		4		
	ST-3	8-10	Shelby Tube					1		
10-	95-3	107-12	2-4-7-12	9	10'-14' - Silty clay, gr	nu maist				
-			1247.12	,	10-14 - Suly Clay, gr	ay, moisi		4		
-	SS-4	12'-14'	2-8-10-9	1				4		
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15-										
-							1	\exists		
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]								-		
30-	SS-11	30'-32'	2-6-6-8	8.5				_		



Boring / Monitoring Well Log

Page 1 of __1___

-IÇII	Client: Lubrizol Corporation					WO#: 09928.00.01 Boring/Well I.D.: SM-10		
770	ject:		zed Material Ir	vestigation	n	Well	Construction Dat	a
	te Stan	4/12	2/96	Date Comp	leted: 4/12/96	Screen: N/A	From	r. To:
- 1	ged B	5. UK	AGT	Checked By	D. DENIRO	Pack: N/A	From	r: To:
Dril	ling Co	 PHILI	P ENV.		EVE SNIEDER	Seal: N/A	From	і: То:
Me	tnoa:	HSA		Equipment:	CIVIE	Grout: N/A	From	n: To:
		oth: 12	ft.		face Elevation:	Inner Casing: N/A		
Initi	al GW	Level:		GW Level:	Time/Date	Outer Casing/Stick Up: N/A		
Depth	Sample	Sample ID.	Blow Counts	Headspace (ppm)	Desc	ription	Remarks	Well Construction
 	ST-	1 0-2'	Shelby Tube					
	ST-	2'-4'	Shelby Tube					-
5-		1 4'-6'	1-4-6-13	1	4'-6' - Silty sand,w/ so orange-brown, moist t			
	- ss-:	6'-8'	5-5-12-18	25	6'-14' - Silty clay, slight moist to wet.	t staining gray-brown,		1
	ST-	8'-10'	Shelby Tube					-
10-	SS-	10'-12'	1-7-7-9	10				
	SS-	12'-14'	4-5-5-8	5				-
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1]							4
30-	SS-1	130'-32'	2-6-6-8	8.5				

Soil Borings/Monitoring Wells



355 EAST CAMPUS VIEW SUITE 250 COLUMBUS, OHIO

Boring /Monitoring Well Log

Page 1 of __2__

El	RM		(614) 433-7900	,					P	age 1 of	
Clien	t:	Lul	prizol Corpora	tion			WO#: 09928.00.01	Boring	g/Well	I.D.: MW-1/SB-2	
Proie	ct:		eter Boring/M	onitoring W			Well	Construction [Data	<u> </u>	
Ĺ	iarte	d: 7/9/	'96	Date Comp			Screen: 2" PVC	F	rom:	46 ft. To: 36 ft.	
	ed By:	M. BA	RNETT	Checked By	^{/:} D. D	ENIRO	Pack: #5 Quartz sand	F	rom:	46 ft. To: 35 ft.	
Drillin	g Co.	PHILII	P ENV.	Oriller:		oore	Seal: bentonite	F	rom:	35 ft. To: 33 ft.	
Metho	od:	HSA	-,	Equipment:			Grout: cement/bentonite	<u></u> F	rom:	33 ft. To: 0 ft.	
Borin	g Dep	th: 46 f		Ground Sur	face Ele	evation:	Inner Casing: PVC				
Initial	GW L	evel:	-	GW Level:	9.66 ft.	Time/Date 7/23/96	Outer Casing/Stick Up: 6" sto	eel casing/14" st	teel ca	sing	
Depth	Sample Type	Sample ID.	Blow Counts	(ppm)		Descr		Remarks		Well Construction	
	SS-1 SS-2		2-4-4-3 4-4-4-4	19		'- Sandy silt, dark np, slight odor.	brown, stained black,			riser	
- 5—	SS-3	4'-6'	5-9-9-7	65	odc		ack, moist to wet,	14" steel casi 0-20'	ing -	-	
-	SS-4	1	6-8-8-10	129	, ,,,,,	ur e s		6" steel casi	no.		
i		8'-10'	1-4-4-4	159	9.5'-	-25' - Silty clay, gra	ıy ,moist, no odor	0'-35'			
1 1 1		10'-12'	1-4-3-7	1				cement/bent grout - 0-33'	onite .		
		15'-17'	3-3-4-6	133							
0	SS-8	20'-22'	4-4-6- 8	0		·					
5	SS-9	25'-27'	4-6-8- 10	10		32' - Clay , grey w ations, damp, no o					
30==9	ŚS-10	30'-32'	6-10-13-15	0							

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355 EAST CAMPUS VIEW SUITE 250 COLUMBUS CHIC

Boring /Monitoring Well Log

El	RM		-00LUMBUS OHI -614) 433-7906	U			I	Page 2 of2
Chen	(Lut	onzol Corpora	tion		WO# 09925,00.01	Boring/We	H I.D.: MW-1/5B-2
Prose	a		ter Boring/M		ell Phæe	V	Vell Construction Data	
F	Aarte	d 7/4/			eted - In/an	Screen 2" PVC	From:	46 ft. To: 36 ft.
Logge	ed By		RNETT	Checked By	D. DENIRO	Pack #5 quartz sand	From:	46 ft. To: 35 ft.
Drillin	g Co	PHILIP		Driller	NT MOORE	Seal bentonite	From:	35 ft. To: 33 ft.
Metho	_	-ISA	L	Equipment:	CME	Grout bentonite/ cemer		33 ft. To: () ft.
Bonn	g Dept			Ground Surf	ace Elevation	Inner Casing	TAN TIGHT	3316 10. 0.12
indal	GW L			GW Level:	Firme/Date 7/23/	PVC Outer Casing/Stick Up:	6" steel casing / 14" steel c	asing
	<u> </u>			19	.66 ft. 7/23/	%n	Seer Casting / 14 Seer C	J.
Depth	Semple 1ype	Gladuas	Blow Courts	Headspace (IPPM)	D:	escription	Remarks	Well Construction
35 - 40	\$S-11	32-34	50/1		Spron refusal € 3 Bedrock € 32	2'	Cement/Bentonite grout 0-33: 6" outer casing +3'-35 Bentonite seal 33'-35' #5 Quarts sand 35'-46'	- Screen 36'-46'
60-T							-	

Boring / Monitoring Well Log

Page 1 of __2___.

WO#: Client: 09928.00.01 Boring/Well I.D.: MW-2/SB-5 **Lubrizol Corporation** rgiect: Well Construction Data Perimeter Boring/Monitoring Well Phase Date Completed: 7/16/96 Screen: .iarted: 56 ft. To: 46 ft. 6/26/96 2" PVC From: Checked By: D. DENIRO Pack: Logged By: M. BARNETT 56 ft. To: 44 ft. From: #5 Quartz sand Drilling Co.: Driller: Seal: bentonite PHILIP ENV. KENT MOORE From: 44ft. To: 41ft. Method: Equipment: Grout: **HSA** cement/bentonite 41ft. To: 0 ft. **CME** From: Boring Depth: Ground Surface Elevation: Inner Casing: 56 ft. **PVC** GW Level: 21.14 ft. Outer Casing/Stick Up: 6" steel casing / 14" steel casing initial GW Level: Time/Date 7/23/96 Headspace (ppm) Well Sample Type Sample Blow Counts Description Remarks Construction rișer 0-2' - Silty caly w/ trace gravel, brown, **5**S-1 0-2 2-2-7-9 1 damp, no odor. 2'-4' 3-5-7-7 2 2'-5' - Sandy silt w/ trace gravel, 14" steel casing orange-brown, damp, no odor 0-20' 4'-6' 3-11-15-17 30 5'-8' - Silt, stained black, moist, slight odor 6'-8' 6-6-2-8 70 Water @ 8' 6" steel casing 8'-10' 6-8-12-12 8'-10' - Silty clay, stained black, wet, 0'-39' 120 slight odor 10'-12' SS-6 2-4-4-10 200 ... sand layer @ 10' 11'-39' - Silty clay, grey, moist towet, no odor cement/bentonite. grout 0-41 \$S-7₽15'-17' 2-2-4-8 15 20. †SS-8 | 20'-22'| 2-2-4-10 5 25-SS-9 25'-27' 0.3 4-6-8-10 30~-\$5-10|30'-32' 0.5 6-10-13-15

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355 EAST CAMPUS VIEW SUITE 250 COLUMBUS OHIO

Boring /Monitoring Well Log

Provect Perime	ARNETT PENV.	Date Complete Checked By Driller K Equipment. Ground Sur GW Level.	D. DENIRO ENT MOORE CME face Elevation [Time/Date 7/23/96]	Screen 2 PVC Pack =5 quartz sand Seal bentonite Grouf bentonite/cement Inner Casing PVC Outer Casing/Stick Up	Construction Data From: From: From: From:	56 ft. To: 46 ft. 56 ft. To: 44 ft. 44 ft. To: 41 ft. 41 ft. To: 0 ft.
Pro-ect Perime L. Jarred 7/9/6 Logged By M. BA Driting Co PHILIP Method HSA Boring Depth 56 ft Initial GW Level - 55-11 32'-34' - 55-12 39'-41' 40	eter Boring/N 98 RNETT PENV.	Date Complete Checked By Driller K Equipment. Ground Sur GW Level.	D. DENIRO ENT MOORE CME face Elevation [Time/Date 7/23/96]	Screen 2 PVC Pack =5 quartz sand Seal bentonite Grouf bentonite/cement Inner Casing PVC Outer Casing/Stick Up	From: From: From: From:	56 ft. To: 46 ft. 56 ft. To: 44 ft. 44 ft. To: 41 ft. 41 ft. To: 0 ft.
Logged By M. BA Drilling Co PHILLIP Method HSA Boring Depth 56 ft Initial GW Level 30— 55-11 32-34 35— 55-12 39-41	96 RNETT PENV.	Date Complication Checked By Driller K. Equipment. Ground Sur GW Level.	D. DENIRO ENT MOORE CME face Elevation [Time/Date 7/23/96]	Pack #5 quartz sand Seal bentonite Grout bentonite/cement Inner Casing PVC Outer Casing/Stick Up	From:	50 ft. To: 44 ft. 44 ft. To: 41 ft. 41 ft. To: 0 ft.
Drilling Co PHILIP Method HSA Boring Depth 56 ft Initial GW Level	PENV.	Driller K Equipment Ground Sur GW Level.	CME face Elevation [Time/Date 7/23/96]	Pack #5 quartz sand Seal bentonite Grouf bentonite/cement Inner Casing PVC Outer Casing/Stick Up	From:	44 ft. To: 41ft. 41 ft. To: 0 ft.
Drilling Co PHILIP Method HSA Boring Depth 56 ft Initial GW Level	PENV.	Driller K Equipment Ground Sur GW Level.	CME face Elevation [Time/Date 7/23/96]	Seal bentonite Grout bentonite/cement Inner Casing PVC Outer Casing/Stick Up.	From:	44 ft. To: 41ft. 41 ft. To: 0 ft.
### ### ### ### ### ### ### ### ### ##	t.	Equipment. Ground Sur GW Level.	CME face Elevation Time/Date 7/23/96	Inner Casing PVC Outer Casing/Stick Up	1777	41 ft. To: 0 ft.
30- -55-11 32'-34'	1.	GW Level.	Time/Date 7/23/96	Outer Casing/Stick Up	12.23	
30- -55-11 32'-34'	Blow Counts	21	1.14ft. 7/23/96	Outer Casing/Stick Up	eel casing/14" steel c	
30- -55-11 32'-34' - 35- - - - - - - - - - - - - - - - - -	Blow Counts			<u>'-</u> }		asing
-55-11 32-34 -35-12 397-41		ľ	Des	cription	Remarks	Well Construction
50	3-5-12-10	0.5	Spoon refusal @ 39' Bedrock @ 39'	ist, no odor	Cement/Bentonite grout - 0'-41'	nser



Boring /Monitoring Well Log

Page 1 of ___2 ___

EJ	RM		(614) 433-7900				۲	age 1 of2
Clien	t:	Lut	orizol Corpora	tion	,	WO#: 09928.00.01	Boring/Well	I.D.: MW-3/SB-9
Proje	et:	Perime	eter Boring/M			We	ell Construction Data	
ī	.arte	d: 7/9/	96	Date Compl	eted: 7/15/96	Screen: 2" PVC	From:	46 ft. To: 36 ft.
	ed By:	IVI BA	RNETT	Checked By	D. DENIRO	Pack: #5 Quartz sand	From:	46 ft. To: 34 ft.
Drillin	g Co.:	PHILIF	PENV.	Driller: K	ENT MOORE	Seal: bentonite	From:	34ft. To: 31ft.
Metho	od:	HSA		Equipment:	CME	Grout: cement/bentoni	te From:	31ft. To: 0 ft.
Boring	g Dep	th: 46 f	t.	l .	ace Elevation:	Inner Casing: PVC		- ,,
Initial	GW L	evel:		GW Level:	0.47 ft. Time/Date	Outer Casing/Stick Up: 6"	steel casing/14" steel ca	sing
Depth	Sample Type	Sample ID.	Blow Counts	Headspace (ppm)		Description	Remarks	Well Construction
5-	5S-1 5S-2 5S-3	0-2' 2'-4' 4'-6' 6'-8'	2-3-4-3 1-2-2-2 1-3-3-4 6-8-10-10	4.7 11.6 8 61	odor. 2'-4' - Silty sand organics, brow 4'-6.5' - Sand, b	- Sand y, brown, dry, no d w/ trace gravel and n, dry, no odor prown, wet, no odor d black @ 5'	14" steel casing 0-20'	riser
	3-5 55-6		6-9-8-4 2-3-3-5	74 112	6.5'-15' - Silt, s slight odor sand layer (etained black, wet,	6" steel casing 0'-37'	
-			1-3-5-7	1.8	15'-25' - Silty cl	lay, grey , moist to damp, no	cement/bentonite grout 0-31'	
20—	SS-8	20'-22'	2-7- 9- 8	0.3	odor		_	
25—	SS-9	25'-27'	5-8-10-10	0	25'-34' - Clay t	w/ trace silt, gray,damp, no odo	or -	
30	6S-10	30'-32'	5-15-17-16	υ			_	



355 EAST CAMPUS VIEW SUITE 250 COLUMBUS OHIO

Boring /Monitoring Well Log

Page 2 of __2

E	RM		#6141 433-7900	~							,	Page 2	of	2
Cherr	t	Lui	brizol Corpora	ehon	-		WO1	09928.00 01		Bor	ing/Wel	H I.D.: ₹	MW-	3/SB-9
Pinse	d		eter Boring/M	onitoring V	Vell Pha	NC .		W	ell Constr	uctio	n Data			
Ĺ	Jarte	d -/G	'9h	Date Comp	leted -	/15/ % 5	Screen	2' PVC			From:	46 ft.	To:	36 ft.
Logg	ed By		RNETT	Checked B	D. D	ENIRO	Pack	#5 quartz sand			From:	40 ft.	To:	34 ft.
Dritten	ıg Co	PHILI	P ENV.	Driller	KENT	MOORE	Seal.	bentonite			From:	354ft	To:	31 ft.
Meth	od	HS	·	Equipment:			Grout	bentonite/cement	<u> </u>	<u></u>	From:	31 ft.		
Born	g Dep	h. 461	ft.	Ground Sur	tace Ele	vation:	inner (Casing PVC						
retal	GW L	evel.		GW Level:	0.47 ft.	Time/Date 7/23/96	Outer		steel casır	g/14	: steel c	asing		
		£	Ī		<u>υ.+/ π.</u>	1 1120	L		1			1		
Depth	Sample 1ype	Sample II	Blow Courts	Headspace (ppm)		Descr	ription		R.	emari	ks 	Co	We nstru	ii ction
35- 35- 50- 55-	55-11	34-36	5 -8-8- 10	0.5	34'-36 pebb	ock @ 33' b' - Weathered lin le to cubble size, s clay, moist, no ode	some s		Benton 3 6" outs -;	T-31' T-31' T-34' T-34'	ealing			screen 36'-46'
60 -											_	1		



Boring /Monitoring Well Log

Page 1 of _1.....

ERM (614) 433-7900	- 			Page 1 o	f _ 1
Client: Lubrizol Corporat	tion	WO#: 09928.00.01	Boring	/Well I.D.: N	1W-4
Project: Perimeter Boring / Mo	onitoring Well Phase	Well	Construction D	ata	
L iarted: 6/25/96	1 0/20/90	Screen: 2" PVC	Fr	om: 4	To: 14 ft.
Logged By: M. BARNETT	Checked By: D. DENIRO	Pack: #5 quartz sand	Fr	rom: 2	To: 14 ft.
Drilling Co.: PHILIP ENV.	Driller: RANDY BURNS	Seal: bentonite	Fr	rom: 0	To: 2ft.
Method: HSA	Equipment: CME	Grout: N/A	Fr	rom:	То:
Boring Depth: 14ft.	i 1	Inner Casing: 2" PVC			
Initial GW Level: approx. 5 ft.	GW Level: 4.45 ft. Time/Date 7/23/96	Outer Casing/Stick Up: N/A			
Sample D. Sample D. Blow Counts	Descri	ption	Remarks	Cor	Well estruction
0-1	Lithological and analytithe drilling of SB-7.	ical samples taken during	Bentonite 0-2' #5 Quartz sand 2'-14'		riser 0-4' screen 4'-14'

355 EAST CAMPUS WEW SUITE 250 COLUMBUS OHIO

Boring /Monitoring Well Log

Page 1 of 1

E	RM		(614) 433-7900							F	Page 1	of	1
Chen		Lub	nzol Corpora	ition		<u> </u>	WO#	04928.00 01		Boring/Wel	1 I.D.:	MW-5	/SB-11
200	4		ter Boring/M	onitoring M	(ell Pha	150		Well	Constru	tion Data			
Ē	Jarte	d 6/27	/9n	Date Comp			Screen	2" PVC		From:	+	To.	14 ft.
L0 99	ed By	M. BA	RNETT	Checked By	D. D.	ENIRO	Pack	#5 quartz sand		From	2	To:	14 ft.
Drillin	ıg Co	PHILIP	ENV.	Driller		100RE	Seal	bentonite		From:	()	To:	2ft.
Meth		HS.4	-	Equipment:	CM	IE	Grout	N/A	<u></u>	From:		To:	
Born	g Dep	h 14ft		Ground Sur			Inner C	asing: 2" PVC			 _		
Indial	GW L	evel oprox. 5	ft.	GW Level	4.64 ft.	Time/Date 7/22/96	Outer C	asing/Stick Up N/A					
Depth	Sample 1ype	ء ا	Show Courts	Headepace (Prim)			ription		Rer	narks	С	We	uction
0-	SS-1 SS-2		3-3-3-4 2-6-6-8	> 1000 900		- Sandy silt w/ t dish-brown, dam			Bentor 0-2	ute	eseses		riser 0-4'
5-	SS-3		4444	700	ode			C.		-	Radioalegases		
-	55-4	6-8	4 4 8 17	980	6'-8.	5' - Clayey silt, sta ng odor	uned bl	ack, sat.,] [
ڀ) 3S-5	8-10	4-8-8-6	350	8.5-	er € 7° 14' Silty clay, gra , slight to no odo		o no staining,	#5 Quar 2'-		+		screen 4'-14'
10-	SS-6	10-12	2-2-4-8	280		ayer 10' to 10.5'	•			_			
	SS-71	12-14	2-6-8-6	80							-		
15-										-	1		
-											1		
20— -											- - -		
25-										_	- - -		
- -											- - -		
30 ⁻										-	1		

355 EAST CAMPUS VIEW SUITE 250 COLUMBUS, OHIO (614) 433-7900

Boring /Monitoring Well Log

Page 1 of ...1____

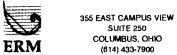
E	RM		(614) 433-7900	•						P	age 1	Of	.1
Clien	t:	Lui	prizol Corpora	tion			WO#:	09928.00.01	Вог	ring/Well	I.D.:	MW-	5/SB-4
Proie	ct:		eter Boring/M	onitoring W	Vell Phas	se		Well	Constructio	n Data			
Ē	arte			Date Compl	leted: 6/	27/96	Screen:	2" PVC		From:	4	To:	14 ft.
	ed By:	M RA	RNFTT	Checked By	D. DE	NIRO	Pack:	#5 quartz sand		From:	2	To:	14 ft.
Drillin	g Co.:	PHILII	PENV.	Driller:	KENT M	100re	Seal:	bentonite		From:	0	To:	2ft.
I AIC II II	ou.	HSA	١	Equipment:	CM	E	Grout:	N/A	<u> </u>	From:		To:	
Borin	g Dep	th: 14ft		Ground Sur	face Elev	ration:	Inner Ca	asing: 2" PVC					
Initial	GW L	evel: pprox. 2	2 ft.	GW Level:	3.42 ft.	Time/Date 7/22/96	Outer C	asing/Stick Up: N/A					
Depth	Sample	,	Blow Counts	Headspace (ppm)	1		iption		Remar	ks	C	We onstru	
0-	 SS-1 SS-2		2-2-4-5 2-2-6-8	120 110	odor	Sandy silt, brow Sandy silt, brow Stained black fro		ed, damp, slight	Bentonite 0-2'	- - -	335353		riser 0-4'
5-	SS-3		2-4-8-10	180		- Silt, stained bla odor	ack, moi	st, slight		-			
-	SS-4	6'-8'	8-12-14-20	120		aturated at 8'				_			
)S-5	8'-10'	2-12-14-18	980	J	er @ 8.5'			#5 Quartz	sand -			
- 4 <u>-2</u>]			ļ	•	Silty clay, gray,	stained	black,	2'-14'				screen 4'-14'
10-	SS-6	10'-12'	4-6-6-10	410		slight to no odo				_	1		
-	SS-7	12'-14'	2 -6 -8-10	380						- - -	800000000000000000000000000000000000000		
1									}	_	1		
-										-	-		
-			1							-	1		
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355 EAST CAMPUS VIEW SUITE 25G COLUMBUS OHIO

Boring /Monitoring Well Log

Page 1 of __1...

E	RM		201 (MBUS 04)						P	age 1	of	.1
Chen	4	Lul	onzol Corpora	ition		WO# (99428.00.01		Bor	ing/Well	I.D.:	MW-	7/SB-1
Ptpma	¢.		eter Boring/M	onitoring V		Well	Constr	uctio	n Data			
į	Jarte	7/1/	'9n	Date Comp	leted. ~ / j / Qh	Screen 2' PVC			From:	4	To:	14 ft.
Logg	ed By		RNETT	Checked B	D. DENIRO	Pack #5 quartz sand	S		From	2	To:	14 ft.
Draffier	ng Co	PHILIF	PENV.	Driller	RANDY BURNS	Seal bentonite	1		From:	0	To:	2ft.
Meth		HS		Equipment	CME	Grout N/A	<u> </u>	<u></u>	From:		To:	
Bonn	g Dept	h 14ft	L	Ground Sur	tace Elevation	Inner Casing: 2" PVC						
Intal	GW L	evel approv	L 5 ft	GW Level	4.45 ft. Time/Date 7, 22 / 9e							
(Jeph	Semple 1ype	4	Blow Courts	Headspace (PPR)		cription	A	emari	ks	α	We	ll ection
0	SS-1 SS-2	0-2	4-16-8-10 2-3- 4- 3	0	()-5.5 - Sandy silt w, moist, no odor.	/ gravel, reddish-gray,		onite -2		菱		nser 0-4'
5—	55-3	4'-6'	2-3-8-8	16	5.5'-8' - Silt, stained b	olack, moist, slight			-	even subserver		
		6'-8' 8'-10'	5-6-6-9 8-9-12-14	32 104	Water € 6	et to saturated, no odor	#5 Qu	ı art z s	iand '			
10	55-6	10-12	3-5-5-n	140	!			2'-14'	 -			screen 4'-14'
1	SS -71	12'-14'	7-4-6-8	146	11.5-14' Silty day, gra	ay, wet , no odor.			•			
15—									-			
-												
20-		i							_			
-	"	 							-			
25—									-	-		
-		:							-			
_		i							-	•		
30			_						_			



Boring /Monitoring Well Log

Page 1 of __1____

Method: H5A	ERM		(614) 433-7900					F	age 1	OI _	- L
Perimeter Boring/Monitoring Well Phase	Client:	Lut	prizol Corpora	tion		WO#: 09928.00.01	Bor	ing/Well	I.D.:	MW-8	8/SB-6
Description Description	Project:			onitoring V		Well	Constructio	n Data			
Checked By: D. DENIRO	D. Jante	.d.		Date Comp	leted: 7/1/96	Screen: 2" PVC		From:	4	To:	14 ft.
Drilling Co. PHILIP ENV. Driller: RANDY BURNS Seal: bentonite From: To: 2	1	M BA	RNFTT	Checked By	y: D. DENIRO	Pack: #5 quartz sand		From:	2	To:	14 ft.
Soring Depth: 14ft. Ground Surface Elevation: Inner Casing: 2" PVC	Drilling Co.	PHILII	P ENV.	Driller:	 -	Seal: bentonite		From:	0	To:	2ft.
Description Parallel Sw Level approx. 3 ft. GW Level: 3.31 ft. Time/Date	Method:					Grout: N/A	<u> </u>	From:		To:	
Third GW Level: approx. 3 ft. GW Level: 3.31 ft. Time/Date / 7/22/96 Outer Casing/Slick Up: N/A	Boring Dep	th: 14ft		Ground Sur	face Elevation:	Inner Casing: 2" PVC					
0—SS-1 0-2' 3-3-3-5 0 0-2' - Silty clay w/ sand & gravel, reddish-brown, dry, no odor. SS-2 2'-4' 1-4-4-5 0 2'-5' - Sand w/ some silt & gravel, reddish-brown, moist, no odor SS-3 4'-6' 4-7-13-9 0 Water @ 5 5'-8.5' - Silt, stained black, wet to saturated, no odorgray @ 7' SS-6 10'-12' 3-4-4-10 0 8.5'-14' Silty clay, gray, moist to wet, no odor. SS-7 12'-14' 2-6-6-8 0	Initial GW L	evel: approx	c. 3 ft.	GW Level:	3.31 ft. Time/Date 7/22/96	Outer Casing/Stick Up: No.					
reddish-brown, dry, no odor. 2'-5' - Sand w/ some silt & gravel, reddish-brown, moist, no odor SS-3 4'-6' 4-7-13-9 0 Water @ 5' SS-4 6'-8' 3-7-19-14 0 Water @ 7' SS-5 8'-10' 2-5-6-10 0 8.5'-14' Silty clay, gray, moist to wet, no odor.	Depth Sample Type	Sample ID.	Blow Counts	Headspace (ppm)	Desc	ription	Remar	ks	Co		
25—	SS-2 SS-3 SS-4 SS-6 SS-6 SS-7 SS-7	2'-4' 4'-6' 6'-8' 8'-10' 10'-12'	1-4-4-5 4-7-13-9 3-7-19-14 2-5-6-10 3-4-4-10	0 0 0 0	reddish-brown, dry, 2'-5' - Sand w/ some reddish-brown, moi: Water @ 5' 5'-8.5' - Silt, stained in odorgray @ 7' 8.5'-14' Silty clay, gra	no odor. silt & gravel, st, no odor black, wet to saturated,	#5 Quartz s	sand			riser ()-4'



355 EAST CAMPUS VIEW SUITE 250 COLUMBUS OHIO

Boring /Monitoring Well Log

Page 1 of __1_.

	VAI		<i>(</i> 514) 433-7900					90 101
Chen		Lul	onzol Corpora	tion		₩Ö# (992 <u>28</u> 00.01	Boring/Well	i. D .: SB-3
Pro	ø		eter Boring/M	onitoring W		Well Co	nstruction Data	
į.	Jane	×d 7/1/	9n		eted 7/1/95	Screen V/A	From:	To [.]
Logg	ed By		RNETT	Checked By	D DENIRO	Pack N/A	From:	To:
Driffer	g Co	PHILIF		Onler	ANDY BURNS	Seal N/A	From:	To:
Methi	od	HS.		Equipment.	CME	Grout cement/bentonite		27 To: ()
Bonn	g Dep			Ground Surf	ace Elevation	Inner Casing		
hital	GW L			GW Level.	Time/Date	N/A Outler Casing/Stick Up: N/A		
<u> </u>	i	1	<u> </u>			1 3/3		
€	Sample 1ype	Sample ID	Bitter Counts	Headspace (ppm)	Des	scription	Remarks	Well Construction
0-	SS-1	0-2	1-4-5-3	0	0-4" - Silty sand w/ brown, dry to more	trace gravel, reddish- st, no odor.	-	
-	55-2	2'-4'	2-3-6-8	0	·		-	
5-	SS-3	4'-6'	3 -6-8- 12	1	4'-7' - Sand, stained	black, wet, no odor	-	
-	55-4	6'-8	5-8-9-17	2	Water € 6' 7'-11' - Silt_stained	black, wet, slight odor	-	
٠	SS-5	8-10	13-23-28-30	1	, II 5110 x 201100		-	
10-	SS-6	10-12	5-17-7-7	39	11'-25' Silty clay, gr no odor.	ay, moist to wet,	 - -	
15	SS-7	15-17	3-5-7-9	33			- - - -	
20-	SS-8	20-22	3-5- 6-9	0			- - -	
- 25— - -	SS-9	<i>15-1</i> 7	5-7-10-11	v	25-27 - Clay, grey,	. moist, no odor	- - - - -	
- - ∞							-	



355 EAST CAMPUS VIEW SUITE 250 COLUMBUS, OHIO

Boring /Monitoring Well Log

Page 1 of ___2___

	KM	<u></u>	(614) 433-7900								raye i UiZ
Clien		Lul	brizol Corpora	tion			WO#:	09928.00.01		Boring/We	il i.D.: SB-7
Proje	·	Perime	eter Boring/Me	onitoring W	/ell Pha	ise			Well Const	ruction Data	
Ē.	iarte	ed: 6/25	5/96	Date Compl	leted: 6	/25/96	Screen:	N/A		From:	To:
2	ed By:	IVI DA	RNETT	Checked By	. D. D	ENIRO	Pack:	N/A		From:	To:
Drillin	g Co.	PHILII	P ENV.	Driller:	ANDY	BURNS	Seal:	N/A		From:	To:
Metho	od:	HS	A	Equipment:			Grout:	cement/ben	tonite	From:	38.5' To: 0
Borin	g Dep	th: 38.5	5 ft.	Ground Sur			Inner Cas				
Initial	GW L	.evel:		GW Level:		Time/Date	Outer Cas	sing/Stick Up:	N/A		
Depth	Sample I ype	Sample ID.	Blow Counts	Headspace (ppm)		Desc	cription		F	Remarks	Well Construction
	5S-1	0-2	1-2-3-4	1		- Sandy silt w/ ti ned black, moist,			n,		
_	6S-2	2'-4'	1-2-3-4	1]
- 5	SS-3	4'-6'	3- 9 -9-7	10							_
	SS-4	6'-8'	9-12-8-7	95		5' - Silty clay, gra ning,wet, no odo					-
4	ੁੇ 5 -5 ਿ	8'-10'	2-5-7-7	NR	Wa	ter @ 7'					1
10— -	SS-6	10'-12'	2-4-4-5	NR							_
1	SS-7	12'-14'	3-5-7-8	NR							4
1 1	6 S-8	15'-17'	4-4-4-6	35							
- 20 - -	SS -9	20'-22'	6-8-8-12	4		pink striations @	20.5				
25— -	5S-10	25'-27'	4-7-10-13	4	25'	30' Clay, gray, w	ret, no odo	r			- - - -
30	SS-11	30'-32'	5-8-11-14	1	30'-	38.5' - Silty clay,	gray, wet,	no odor			- -

355 EAST CAMPUS VIEW SUITE 250 COLUMBUS OHIO (614) 433-7900

Boring /Monitoring Well Log

Page 2 of __2_

	CIVI		(614) 433-7900					
Chen		Lul	brizot Corpora	etion		MO4 (Ann 58 (A) (A)	Boring/We	eli I.D.: SB-7
Prose	Ċ.	Penm	eter Boring/M	lonitoring W	ell Pha~e	Well	Construction Data	l
į.	tarte	d n/25	5/ U p	Date Comple	Hed n : 25/9n	Screen N/A	From:	To:
Logg	ed By		ARNETT	Checked By	D. DENIRO	Pack N/A	From:	To:
Dri	g Co	PHILI		Onlier	ANDY BURNS	Sea: N/A	From:	To:
Meth	od	HS		Equipment	CME	Grout cement/bentonite	- 	
Bonn	g Dep		5 ft.	Ground Surfa	ace Elevation	Inner Casing		30.3 10. 0
Initial	GW L			GW Level	Time/Date	N/A Outer Casing/Stick Up N/A		
┢	$\overline{}$	1	1	+			· 	<u> </u>
Clegar.	Sample 1 ypu	Sample ID	Blow Counts	Hondhance (pym)	Des	scription	Remarks	Well Construction
30-	ł							┥
-	1						Ì	†
]
_								4
35-	SS-12	35-37	4-8-11-15	4	Silty clay, grey, no	odor		-
-	-		1					4
-	1							1
-1	í				Bedrock € 38.5]
40			}	. !				_
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-								-
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45—		İ						_]
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355 EAST CAMPUS VIEW SUITE 250 COLUMBUS, OHIO

Boring /Monitoring Well Log

	KM		(614) 433-7900					age 1011
Client	t:	Lul	brizol Corpora	tion		WO#: 09928.00.01	Boring/We	I I.D.: SB-8
Proie	ct:		eter Boring/M		'ell Phase	Well C	Construction Data	
Ĺ	tarte	d: 6/27	7/96	Date Compl	eted: 6/27/96	Screen: N/A	From:	To:
Logge	ed By:		RNETT	Checked By	D. DENIRO	Pack: N/A	From:	To:
Drillin	g Co.	PHILI	P ENV.	Driller: K	ENT MOORE	Seal: N/A	From:	To:
Metho	od:	HS		Equipment:	CME	Grout: cement/bentonite	From:	27' To: ()
Boring	Dep			Ground Surf	ace Elevation:	Inner Casing: N/A		
Initial	GW L	evel:		GW Level:	Time/Date	Outer Casing/Stick Up: N/A		
Depth	Sample Type	Sample ID.	Blow Counts	Headspace (ppm)	Desc	cription	Remarks	Well Construction
			;					
0-	SS-1	0-2'	4446	300	0-4' - Sandy clay w some black staining	/ trace gravel, red-brown, g, damp, odor.	-	-
-	SS-2	2'-4'	4-6-6-10	180				1
5	SS-3	4'-6'	4-6 -10-10	500		ng degrees of sand and clay, t to wet, slight odor	-	-
-	SS-4	6'-8'	4-4-8-8	470	Water @ 7'			-
- - 4)S-5	8'-10'	10-6-6-4	900	8'-22' - Silty clay, g	ray, wet , no odor		-
10-	SS-6	10'-12'	6-10-4-6	NR				- -
- - -							·	-
15	∌ S-7	□15'-17	4-4-6	60			-	-
1								- -
- - -								1
20-	SS-8	20'-22'	2-4-4-6	30			-	
4								-
25	55-9	25'-27'	2 -4-6- 12	10	25'-27' - Clay, grey,	maiet na adar		-
1				1.0	20 27 - Clay, giey,	moist, no odoi		1
4								4
30-	,		•					4

355 EAST CAMPUS VIEW SUFFE 250 COLUMBUS OHO

Boring /Monitoring Well Log

Page 1 of 6141 433-7900 WO# 09928.00.01 Boring/Well I.D.: SB-10 **Lubrizol** Corporation Promect Well Construction Data Perimeter Boring/Monitoring Well Phase Date Completed 6 28 / 46 Screen From: To: n/28/9nN/A Pack Logged By Checked By M. BARNETT D. DENIRO MA From: To: Seal Drilling Co N/AKENT MOORE From: To: PHILIP ENV. Method. guipment: CME From: **HSA** bentonite/cement To: 27 0 Boning Depth Ground Surface Elevation: Inner Casing: 27 ft. Initial GW Level Time/Date GW Level Outer Casing/Stick Up. N/A Well * (Edd) Blow Counts Remarks Description Construction SS-1 0-2' - Sandy silt w/ trace gravel, dark brown, 0-2 3466 7 organic matter, moist, no odor. SS-2 2'-4' 2 2-4-4-4 2'-4' - Silt clay w/ trace sand & gravel, orange-brown, moist to wet, no odor **SS-3** 4.6 2-4-6-6 Water € 3 4'-8' - Silty sand, stained black, wet, slight odor. 350 55-4 6.4 6-10-10-12 8'-12' - Silt, stained black, wet, slight odor **3**S-5 8-10 44-14-12 > 1000 10-SS-6 10-12 12-11-10-8 > 1000 12'-25' Silty clay, gray, wet, no odor. SS-7715-17 4-8-12-8 110 20 55-8 207-22 2-4-8-6 SS-9 25-27 4-8-12-12 25-27 - Clay, grey, moist, no odor



Boring /Monitoring Well Log

Page 1 of __2__

ERM (614) 433-7900								age 101	
Client: Lubrizol Corpora		etion		WO#: 09928.00.01	Boring/Well	Boring/Well I.D.: SB-12			
Project: Perimeter Boring / Mo				onitoring Well Phase		Well C	Construction Data	struction Data	
L darted: 6/24/96			/96	Date Completed: 6/24/96		Screen: N/A	From:	To:	
Logged By: M. BARNETT				Checked By: D. DENIRO		Pack: N/A	From:	To:	
Drilling Co.: PHILIP ENV.				Driller: RANDY BURNS		Seal: N/A	From:	To:	
			5A	Equipment: CME		Grout: cement/bentonite	From:	38' To: 0	
Borin					face Elevation:	Inner Casing: N/A			
Initial GW Level:				GW Level:	Time/Date	Outer Casing/Stick Up: N/A			
Depth	Sample Type	Sample ID.	Blow Counts	Headspace (ppm)	Desc	ription	Remarks	Well Construction	
0-	SS-1 SS-2	0-2'	4-6-11-13 6-11-11-18	20	0-3' - Sandy silt w/ t stained black, moist,	race gravel, dark brown, pet. odor.	-		
5-	SS-3	4'-6'	6-12-14-14	40	3'-6' - Silt, stained bla	ack, moist, odor	·		
-	SS-4	6'-8'	14-15-16-13	100	6'-9' - Silt, gray w/ si wet, no odor	light black staining,	_		
	S-5	8'-10'	6-8-10-12	80	Water @ 6.5'		_		
10-	SS-6	10'-12'	9-7-6- 10	120	9'-18' Silty clay, gray wet, no odor.	, stained black,			
-	SS-7	12'-14'	4-5-6-6	40			-		
15	SS-8	14'-16'	2-2-5-5	NR			_		
1	SS-9	16'-18'	2-3-7-9	NR			_		
-	5S-10	18'-20'	3-7- 9 -10	NR	18'-36' - Clay, grey, v no odor	vet to moist,	_		
20-	S-11	20'-22'	2-5- 6 -7	NR			-		
-	5 S -12	22'-24'	5-6-5-4	NR	silty clay layer app	prox. 10" thick	<u>-</u>		
25	5 S -13	24'-26'	5-8-8-12	NR			-		
1	S-14	26'-28'	5-6-8-10	NR	silty clay layer app	prox. 12" thick	- -		
+	5S-15	28'-30'	2-6-4-8	NR			-		
30	SS-16	30'-32'	3-4-6-10	NR					

FRM

355 EAST CAMPUS VIEW SUITE 250 COLUMBUS OHIO

Boring /Monitoring Well Log

Page 2 of __2

	V.MI		e14) 433-7900					1 age 2 01
Chen	Lubrizol Corpora		ition		WO# (HH2S,00,0)	Boring	Well I.D.: SB-12	
Prote	Perimeter Boring / Mc			lonitoring Well Phase		Well Construction Data		
L tarted 6/24/46			/4n	Date Completed n 24/4n		Screen	Fre	om: To:
,				Checked By	D DENIRO	Pack \ \ A	Fn	om To:
Drilling Co PHILIP ENV.				Driller R.	ANDY BURNS	Seal N/A	Fr	om: To:
Metho				Equipment CME		Grout cement/bentonite		om: 38° To: ()
Bonn	HSA			Ground Surface Elevation		Inner Casing	<u> </u>	30 10 0
			<u>-</u>	GW Level. Time/Date		N/A Outer Casing/Stick Up N/A		
<u> </u>	<u> </u>	-	<u> </u>	 				
er.	Sample 1ype	Sample IO	Blow Courts	(wdd) eoedspeaji	Des	cription	Remarks	Well Construction
30-	ł							4
-	cc				Clay, grey, wet to	moist, no odor		4
_	P>1/	B2-34	10-12-17-21	NR]
_	55-18	 34'-36'	6-10-20-20	NR				_
35-	ł	l						\dashv
-	5S-19	36 - 38	4-8-10-50/2	NR				4
-~	1.				Spoon refusal @ 3	7.5		1
	ĺ]
40-								4
4				1				4
-				;				1
7]
45-								4
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355 EAST CAMPUS VIEW SUITE 250 COLUMBUS, OHIO

Boring /Monitoring Well Log

ER	KM	(614) 433-7900	_			Pa	ge 1 of .1	
Client:	ient: Lubrizol Corpora		ition		WO#: 09928.00.01	Boring/Well I.D.: SB-13		
Projec	t: Perim		lonitoring Well Phase		Well C	onstruction Data		
D	arted: 7/2	/%	Date Completed: 7/2/96		Screen: N/A	From:	To:	
Logge	MI N	ARNETT	Checked By	D. DENIRO	Pack: N/A	From:	То:	
Orilling	PHILI	P ENV.	Driller: RANDY BURNS		Seal: N/A	From:	To:	
INEUIO	". HSA		Equipment: CME		Grout: cement/bentonite	From:	27' To: 0	
Boring	Depth: 27	ft.	Ground Surface Elevation:		Inner Casing:		<u></u>	
initial (GW Level:	· -	GW Level:				<u>-</u>	
Depth	Sample Type Sample ID.	Blow Counts	Headspace (ppm)	Des	cription	Remarks	Well Construction	
5-	SS-2 2'-4' SS-3 4'-6' SS-4 6'-8' S-5 8'-10'	4-8-10-12 6-8-12-17 8-10-12-14	0 0 0 0	0-5' - Sandy silt w/ reddish-orange, modush-orange,	n, wet, no odor et, no odor			
	\$-7 \textsquare 5'-17		0					
25-	SS-9 25'-27'	9-10-14-20	0	25'-27' - Clay, grey,	moist, no odor	- - - - -		

Geoprobe Borings

355 East Campus View, Sutte 250 COLUMBUS, OHIO (614) 433-7900

Boring /Monitoring Well Log

Page 1 of __1_

E	CIVI	-							290 TOT 1, 11
Client: Lubrizol Corporation		on		WO#: 09928.00.01		Boring/Well I.D.: GB-1			
Project: Geoprobe Boring Pl			orobe Boring P	'hase		L		struction Data	
12-10-20			o-96	Date Completed: 12-16-96		Screen: NA		From:	To:
Logged By: M. BARNETT				Checked By: S. DRAGT		Pack: NA		From:	То:
Drilling Co.: Sprowls Drilling			wls Drilling	Driller: D. WRIGHT		Seal: NA		From:	To:
Metho	od:	Geor	orobe	Equipment: Geoprobe		Grout: Bentonite		From:	10' To: 0
Borin	g Dep	th: 10	0,	Ground Surface Elevation:		Inner Casing:	NA		
Initial	Initial GW Level: ~ 6'				Time/Date	Outer Casing/Stick Up: NA			
Sample ID. Sample ID.			Blow Counts	Headspace (ppm)	Description		F	Remarks	Well Construction
10 - 15 - 1 - 20	SI-3 SI-4	0-2' 2'-4' 4'-6' 6'-8' 8'-10'			1'-8' - Silt w/ fine to i light brown, damp turns black, wet @	psoil, dark brown, wet medium grained sand, 5'			
30								-	

355 East Campus View State 250 COLUMBUS OHIO (614) 433-7900

Boring /Monitoring Well Log

Page 1 of __1.__

	CIVI			_					
Chent		Lubn	izol Corporatio	жî		WO# 09925,00,01		Boring/Well	I.D.: GB-2
Ptomo	7	Geop	robe Bonng P	hase		We	ell Const	ruction Data	
Ĺ.	Jane	12-16	-4h	Date Compl	17-10-40	Screen \ \ \		From:	To:
Logge	d By	M B	ARNETT	Checked By	S. DRAGT	Pack \A		From:	To:
Drilling	Co	Spnii	wis Drilling	Oriller:	D WRIGHT	Seal \A		From:	To:
Metho	d	Ceop	mbe	Equipment	Geoprobe	Grout Bentonite		From:	10° To: 0
Boring	Dept			Ground Surf	ace Elevation	Inner Casing	NA	7777	
Instal (GW L		4"	GW Level:	Time/Date	Outer Casing/Stick Up	NA.		
			<u> </u>						1
Depth	Sample 1 ype	Ch elgmp#	Blow Counts	Headspace (ppm)	Dex	scription	f	Remarks	Well Construction
5—	SI-3 SI-4	0-2° 2°-4° 4°-6° 6°-8° 8°-10°			2:7 - Silt w/ fine to and gravel, light bri turns black @ 5	ppsoil, dark brown, wet medium grained sand own, moist to wet trace sand and gravel,			
30=				· · ·				- -	

355 East Campus View. Suite 250. COLUMBUS. OHIO (614) 433-7900

Boring /Monitoring Well Log

Page 1 of __1___

Client:		Lubr	izol Corporatio	on		WO#: 09928.00.01		Boring/Well	I.D.: GB-3
Project:		Geop	robe Boring Pl	nase		Well	Constru	ction Data	
أنأ	artec	i: 12-17	-96	Date Compl	eted: 12-17-%	Screen: NA		From:	To:
Logged	Ву:	M. B.	ARNETT	Checked By	^{/:} S. DRAGT	Pack: NA		From:	To:
Drilling	Geoprobe Boril ilarted: 12-17-96 ed By: M. BARNETT ig Co.: Sprowls Drillin od: Geoprobe g Depth: 12' GW Level: ~ 4'		wls Drilling	Drifter:	D. WRIGHT	Seal: NA		From:	To:
Method	12-17-96 d By: M. BARNETT Go.: Sprowls Drilling: Geoprobe Depth: 12' SW Level: ~ 4' SI-1 0-2' SI-2 2'-4' SI-3 4'-6' SI-4 6'-8' SI-5 8'-10'		robe	Equipment:	Geoprobe	Grout: Bentonite	Z	From:	12' To: 0
Boring (Dept	h: 12		Ground Sur	face Elevation:	Inner Casing:	NA		
Initial G	W Le	evel: _	4'	GW Level:	Time/Date	Outer Casing/Stick Up:	NA		
Depth	Type	Sample ID.	Blow Counts	Headspace (ppm)	Descr	ription	Re	marks	Well Construction
					0-4' - Silty sand w/gra moist to wet	vel, organics, brown,			
5-					4'-6' - Fine to medium gravel, orangish-brow 6'-10' - Silt w/ fine san odor	n, saturated			
F									
	,1-0	10-12			10-12 - Sitty Clay W/ C	race fine sand, gray, moist		-	
								-	
20-					•			- - -	
25-								- -	
30=								-	

COLUMBUS OHIC (614) 433-7900

Boring /Monitoring Well Log

Page 1 of

WO! **Eubrizol Corporation** Boring/Well I.D.: (10025-00-01 Pro-ct Geoprobe Boring Phase Well Construction Data Date Completed Screen Aarted 12-17-96 12-17-96 From: To: Checked By S. DRAGT Logged By Pack M BARNETT 11 From: To: **Dritting Co D WRIGHT** Sprowls Drilling To: 11 From: Method quipment Grout: From: Geoprobe Georgrobe 8 To: 0 Bentonite Boring Depth Ground Surface Elevation Inner Casing. NA GW Level: Instal GW Level Time/Date Outer Casing/Stick Up ~ 3 NA Headspace (ppm) Well Sample 1 ype Blow Courts Description Remarks Cepth Construction 0--| SI-1 | 0-2" 0-o' - Fine to medium sand w/some silt, organics, orange-brown, wet SI-2 2'-4" gravel seam @ 3', saturated 51-3 4-6 5 SI-4 6'-8' 6'-8' - Silty clay w/ trace fine sand, gray, moist 10 15 20 25 30=

355 East Campus View, Suite 250 COLUMBUS, OHIO (614) 433-7900

Boring /Monitoring Well Log

Page 1 of __1___

	- TATA										
Clien		Lubr	izol Corporatio	on		WO#: 09928.00.01		Boring/Well I.D.: GB			
Proie			orobe Boring Pl	hase		Well	Constr	uction Data			
Ĺ,	tarte	d: 12-17	'-96	Date Compl	12-17-70	Screen: NA		From:	To:		
Logg	ed By:		ARNETT	Checked By	S. DRAGT	Pack: NA		From:	To:		
Drillin	g Co.:	Spro	wls Drilling	Driller:	D. WRIGHT	Seal: NA		From:	To:		
Meth	od:	Geop	orobe	Equipment:	Geoprobe	Grout: Bentonite	<u> </u>	From:	10' To: 0		
Borin	g Dept			Ground Surf	face Elevation:	Inner Casing	NA				
Initial	GW L	evel: ~	4'	GW Level:	Time/Date	Outer Casing/Stick Un:	NA				
	1	_		8	<u> </u>		T				
Depth	Sample Type	Sample ID	Blow Counts	Headspace (ppm)	Desc	cription	R	emarks	Well Construction		
10	SI-2 SI-3 SI-4	0-2' 2'-4' 4'-6' 6'-8' 8'-10'			moist	race gravel, orange-brown, sand w/ some silt, orange-wet					
30=	.							-			

256 East Campus Vew Suite 250 COLUMBUS OHIO 614) 433-7900

Boring /Monitoring Well Log

ERM		1614) 433-7900					Pa	ge 1 of .l.
hent	Lubr	zol Corporati	on		WO# (NH2% (NH (H)	Boring	g/Well I	. D .: GB-6
pect	Cerry	robe Boring F	hase.		Well (Construction I	Data	
starte	d 12-17	-9h	Date Comple	1-11, -41	Screen NA	F	rom:	To:
ogged By		ARNETT	Checked By	S. DRAGT	Pack \A	F	rom:	To:
nilling Co	Spro	wis Drilling	Oriller.	D WRIGHT	Seal NA	F	rom:	To:
ethod	Genp	mbe	Equipment	Geoprobe	Grout Bentonite	- ZZZ	rom:	1()* To: ()
oning Dep		•	Ground Surfa	ace Elevation	Inner Casing	NA		
ed GW L	evel _	4.	GW Level	Time/Date	Outer Casing/Stick Up:	ÑA		
Sample Type	Semple II)	Blow Counts	iendepace (ppm)	De	escription	Remarks		Well Construction
5- - SI-4	2-4° 4'-6'			moist .5-5' - Silty sand w/ moist wet # 4'				
Ĭ							- -	

355 East Campus View, Suite 250. COLUMBUS, OHIO (614) 433-7900

Boring /Monitoring Well Log

Page 1 of __1___

Clien	t:	Lubr	izol Corporatio	on	 	WO#: 09928.00.01	Boi	ring/Well	I.D.: GB-7
Proie	Çt:					+	i Construction		
Ē,	iarte			Date Comp	leted: 12-18-96	Screen: NA		From:	To:
Logge	Geoprobe Boring Inc. Geoprobe Boring Inc. Geoprobe Geoprobe Geoprobe Geoprobe 12' Blow County			Checked By	S. DRAGT	Pack: NA		From:	To:
Drillin	g Co.:			Driller:	D. WRIGHT	Seal: NA		From:	To:
Metho	od:			Equipment:	Geoprobe	Grout: Bentonite	<u> </u>	From:	12' To: ()
Borin	g Dep	th ·		Ground Sur	face Elevation:	Inner Casing:	NA		
Initial	GW L			GW Level:	Time/Date	Outer Casing/Stick Up:	NA		
Depth	Sample	Sample ID.	Blow Counts	Headspace (ppm)	Desc	cription	Remar	ks	Well Construction
o-	,				0-5' - Silty sand w/ tra moist	ace gravel, orange-brown,		-	
_	SI-3	4'-6'		}	wet @ 4'			_	
5—		41.50			5'-10' - Silt w/ trace c	lay, stained black, moist			
	5I- 4	6'-8'						-	
روستار المارات	31-5	8'-10'						- -	
10-	SI-6	10'-12'			10'-12' - Silty clay, gra	y, moist .			
-									
4								_	
15								_	
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Boring /Monitoring Well Log

Page 1 of ._1..

E	RM		#614) 433-7900				Р	age 1 of1
Cher	M .	Lubr	izol Corporati	on		WO# 09928.00.01	Boring/Well	I.D.: GB-8
Prp	c t	Cerip	probe Boring P	hase		w	ell Construction Data	
ŧ	Jarte	12-18		Date Comple	eled 12-18-4h	Screen	From:	To:
Logg	ed By	M. B.	ARNETT	Checked By	S DRAGT	Pack NA	From:	To:
Drillia	ng Co		wis Drilling	Oriller	D WRIGHT	Seal	From:	To:
Meth	od	Geop	<u>`</u>	Equipment:	Geoprobe	Grout Bentonite	From:	12' To: ()
Bonn	ng Dep			Ground Surf	ace Elevation	Inner Casing.	NA NA	
India	GW L		4"	GW Level:	Time/Date	Outer Casing/Stick Up.	NA NA	
	ī		<u>. </u>	1		<u> </u>		
Depth	Semple	Ch ekmeñ	Blow Counts	Headspace (ppm)	De	scription	Remarks	Well Construction
	-							
0-	SI-1	0-2			0-6' - Silty sand w / t	race gravel, brown,	-	
-	51-2	2'-4'			orangish-brown	from 2		
-	SI-3	4-6			wet # 4"		-	-
5-	- SI-4	4.2		,		clay, stained black, wet,	-	1
-,		0-0			organic odor			1
		8-10						-
-	1						-	-
10-	51-6	10-12		1	10-12 - Silty day gr	ray, moist	-	1
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15—	1	 					-	1
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Boring /Monitoring Well Log

Page 1 of _1___

Clier	ıt:	Lubi	izol Corporatio	on		WO#: 09928,00.01		Bor	ing/Well	I.D.:	GB-9)
Proie	``		orobe Boring P	hase		·	ell Const	ructio	n Data			
Ē	arte	d: 12-18	 3-96	Date Comp	12-10-70	Screen: NA			From:		To:	
Logg	ed By:		ARNETT	Checked By	y: S. DRAGT	Pack: NA			From:		To:	
Drillin	ng Co.:	Spro	wls Drilling	Driller:	D. WRIGHT	Seal: NA			From:		To:	
Meth	od:		probe	Equipment:	Geoprobe	Grout: Bentonite		777	From:	10'	To:	0
Borin	g Depi	h:	0.	Ground Sur	face Elevation:	Inner Casing:	NA	<u> </u>				
Initial	GW L		5'	GW Level:	Time/Date	Outer Casing/Stick Up:	NA					
		<u> </u>		-						<u> </u>		
Depth	Sample 1 ype	Sample ID.	Blow Counts	Headspace (ppm)	Desc	ription	F	Remari	ks	Co	Well Instruc	
10-20-25-	SI-2 SI-3 SI-4	0-2' 2'-4' 4'-6' 6'-8' 8'-10'			0-5' - Silty sand w/ tramoist orangish-brown fre wet @ 5' 5'-8.5' - Silt w/ trace organic odor 8.5'-10' - Silty clay, gra	om 2'			-			
30	1											

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Boring /Monitoring Well Log

Page 1 of __1____

	<u>RM</u>							Page 1 of1
Chen		Lubr	nzol Corporati	ion		WO# (MM28.00).01	Boring/We	ell I.D.: GB-10
tose	•		orobe Boring f			Well (Construction Data	1
		12-12	S-96	Date Comp	((p-ver)	Screen NA	From:	To:
	ed By	M. B	ARNETT	Checked By	r. S. DRAGT	Pack NA	From.	To:
	g Co	Spro	wis Drilling	Order	D. WRIGHT	Sea: NA	From:	To:
Aeth	od	Georg	orobe	Equipment	Geoprobe	Grout Bentonite	From:	10' To: 0
	g Dep	10	ſr	Ground Sur	face Elevation	Inner Casing	NA.	
relical	GW L	evel	5	GW Level.	Time/Date	Outer Casing/Stick Up:	NA.	
()ept	Sample 1ype	Sample (C)	Blow Counts	Headhpace (ppm)	De	scription	Remarks	Well Construction
-	SI-1 SI-2	0-2° 2'-4'			0-0.5 - Organic rich 0.5'-5.5' - Silty sand v orange-brown, moi	w/ trace gravel,		-
-	SI-3	4'-6'	:					4
5— -	i .	6-8			wet	coarse sand w/gravel, brown, day, gray-brown, moist,		- -
	SI-5	8-10			8'-10' - Silty clay, gra			1
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355 East Campus View. Suite 250. COLUMBUS, OHIO (614) 433-7900

Boring /Monitoring Well Log

Page 1 of ___1___

CICIVI								
Client:	Lubr	izol Corporatio	on		WO#: 09928.00.01		Boring/Well	I. D. : GB-11
Proiect:	Geop	robe Boring Pl			We	ell Const	ruction Data	
L tarte	d: 12-19	- 96	Date Compl	12-19-90	Screen: NA		From:	То:
Logged By:	М. В	ARNETT	Checked By	S. DRAGT	Pack: NA		From:	To:
Drilling Co.	Sprov	wls Drilling	Driller:	D. WRIGHT	Seal: NA		From:	To:
Method:	Geop	robe	Equipment:	Geoprobe	Grout: Bentonite		From:	10' To: 0
Boring Dep	th: 10) [']	Ground Surf	ace Elevation:	Inner Casing:	NA		
Initial GW L	evel: ~	5'	GW Level:	Time/Date	Outer Casing/Stick Up:	NA		
Depth Sample Type	Sample ID	Blow Counts	Headspace (ppm)	Desci	ription	F	Remarks	Well Construction
0— SI-1	0-2' 2'-4'			0-8' - Silty sand, orang damp	ish-brown,			
5—	4'-6' 6'-8'			turning brown, we	rt @4'			
ji-5	8'-10'			8'-10' - Silty clay, gray,	. moist		- - -	
15							· -	
20-								
25—							- - -	
30							-	

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Boring /Monitoring Well Log

Page 1 of _1

	CM								geror _1
Chen		Lubr	izol Corporatio	on		MCra (354524'00'01		Boring/Well	I.D.: GB-12
Prove	·		robe Boring P	hase		1	eli Consti	ruction Data	
	Jarte	12-19	1-9h	Date Comple	eted 12-19-95	Screen NA		From:	To:
Logge	xd By	M. B	ARNETT	Checked By	5 DRAGT	Pack NA		From:	To:
Drillin	g Co	Sproi	wis Drilling	Driller:	D WRIGHT	Seal NA		From:	To:
Metho	xd	Geop	robe	Equipment	Geoprobe	Grout Bentonite		From.	10° To: 0
Bonn	Dept	h: 10	Υ	Ground Surf	ace Elevation	Inner Casing.	NA		
retal	GW L	evel _	5	GW Level	Time/Date	Outer Casing/Stick Up	NA	·	
Depth	ackus;	Sample I()	Blow Counts	Headspace (ppm)	Des	cription	F	lemarks	Well Construction
o	SI-1 SI-2	0-2" 2"-4"			0-8" - Stity sand w/ t orangish-brown, dar			 -	
5—		4'-6' 6'-8'			turning brown, w	et æ̃3'		-	
10-	SI-5	8-10			8'-10' - Silty clay, gra wet	y, moist to		- - - -	
15—								- - -	
- 20 - -				:				- - -	
25								- - -	
- مح								- -	

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Boring /Monitoring Well Log

Page 1 of __1_

Per Comprobe Boring Phase Well Construction Data	EKIVI											ugo ,		4
Lstated	Client:	Lubriz	ol Corporatio	on			WO#: 09	928.00.01		Bor	ing/Well	I.D.:	GB-1	13
Deglad By M. BARNETT Checked By S. DRAGT Pack: NA From: To:	Project:	Geopre	obe Boring Pl	hase					Well Const	ruction	n Data			
Drilling Co. Sprowls Drilling Drilling Drilling Drilling Drilling Drilling Drilling Drilling Drilling Couprobe Equipment: Geoprobe Grout Bentonite Signature 12 To: United States of the	tarted	d: 12-19-9	96	1		12-19-96	Screen:	NA			From:		To:	
Dolling Co. Sprowls Drilling Method: Ccoprobe Group Depth: 12 Ground Surface Elevation: Inner Casing: NA Inner Casin	Logged By:	M. BA	RNETT	Checked By	y: S. DR	AGT	Pack:	NA			From:		To:	
Soring Depth 12]	Sprow	ls Drilling	Driller:			Seal:	NA			From:		To:	
Initial GW Level:	Method:	Geopre	obe	Equipment:	Geop	robe	Grout:	Bentonite			From:	12'	To:	0
Second S	Boring Depti	h: 12'		Ground Sur	face Ele	vation:	Inner Casi	ing:						
0-10' - Silty sand w/ trace gravel, orangish-brown, damp to moist SI-2 2-4' - SI-3 4'-6' 5- SI-4 6-8' - SI-5 8-10' 10'-12' - Silty clay, gray, moist to wet	Initial GW Le	evel: ~ 6'	,	GW Level:		Time/Date	Outer Cas	ing/Stick Up:	NA					
SI-2 2'-4' SI-3 4'-6' SI-4 6'-8' SI-5 8'-10' SI-6 10'-12' SI-6 10'-12' Orangish-brown, damp to moist	Depth Sample Type	Sample ID.	Blow Counts	Headspace (ppm)		Des	cription		F	Remarl	ks	Co		
30=4	- SI-2 - SI-3 5 - SI-4 - SI-5 10 - SI-6	2'-4' 4'-6' 6'-8' 8'-10'			tur	gish-brown, dan	np to moist t <i>@</i> 6'							
	30=										- -			

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Boring /Monitoring Well Log

Page 1 of _1

	RM	_	20141 4351 240					Pa	ge 1 of _ 1
Chen		Lubr	zol Corporati	ശ		WO# 09425,00.01	Bo	ring/Well	. D .: GB-14
Pyee			robe Boring P	hase		w	ell Construction	on Data	
Ĺ	Jarte	12-14	-4h	Date Comp	- I-a	Screen NA		From:	To:
Logg	ed By		ARNETT	Checked By	S. DRAGT	Pack NA		From:	To:
Dritten	g Co	Sproi	wis Drilling	Driller.	D WRIGHT	Seal. NA		From:	To:
Metho	od	Gerup	robe	Equipment	Geoprobe	Grout Bentonite	<u></u>	From:	12' To: ()
Bonn	Dep			Ground Sur	face Elevation	Inner Casing.	NA NA		
Instal	G W L		5.5	GW Level.	Time/Date	Outer Casing/Stick Up:	NA		
Ceph	Sample Type	Ch akknak	Blaw Counts	Headquace (ppm)	De	scription	Rema	rks	Well Construction
-	SI-1 SI-2	0-2			0-10" - Silty sand was brown, damp to mo			1	
5—	SI-3	4'-6'			wet # 5.5			1	
	SI- 4	6'-8'						-	
٠	SI-5	8-10°						-	
10-	SI-6	10-12			10'-12' - Silty clay, g wet	ray, moist to		_	
1				:				4	
15—				:				-	
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Boring /Monitoring Well Log

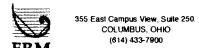
Page 1 of ___1___

<u> </u>			· · · · · · · · · · · · · · · · · · ·								
Client		Lubri	zol Corporatio	on		WO#: 09928.00.01		Boring/Well	I.D.: GB-15		
Proiec	7		robe Boring Pl		······································	Well Construction Data					
Ē.	tarte	12-19	-96	Date Compl	12-19-90	Screen: NA		From:	To:		
Logge	d By:		ARNETT	Checked By	. S. DRAGT	Pack: NA	ž.	From:	To:		
Drilling	g Co.:	Sprov	vls Drilling	Driller:	D. WRIGHT	Seal: NA		From:	To:		
Metho	d:	Geop	robe	Equipment:	Geoprobe	Grout: Bentonite		From:	10' To: 0		
Boring	Dept			Ground Sur	face Elevation:	Inner Casing:	NA				
Initial (GW L			GW Level:	Time/Date	Outer Casing/Stick Up:	NA				
							T				
Depth	Sample Type	Sample ID.	Blow Counts	(ppm)	Desc	cription	R	emarks	Well Construction		
5	SI-3 SI-4	2'-4' 4'-6'			0-0.5' - Organic rich to 0.5'-8.5' - Silty sand w brown, damp to mois turning gray w/ so slight organic odor @ 8.5'-10' - Silty clay, gra	trace gravel, st st ome black staining, wet, 6'					
30=											

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Boring /Monitoring Well Log

ERM	ſ	,,,				F	Page 1 of1		
Chent	Lubr	nzol Corporati	on		WO# (HH28,00.01	Boring/Wel	1.D.: GB-1n		
Project.	Cery	orobe Bornng F	hase		W	ell Construction Data	ruction Data		
	ted 12-20	1-9 ի	Date Comple	17,-7(1,-24)	Screen NA	From	To:		
.ogged B	y M.B	ARNETT	Checked By	S DRAGT	Pack NA	From:	To:		
Drilling C	Spm	wis Drilling	Dellar	D WRIGHT	Seal NA	From:	To:		
Method		onibe	Equipment	Geoprobe	Grout Bentonite	From.	10° To: 0		
Boring De		σ	Ground Surfa		Inner Casing	NA SSS			
Instal GW	11.	5	GW Level	Time/Date	Outer Casing/Stick Up:	NA NA			
(Nample		Show Counts	Headspace (ppm)	De	escription	Remarks	Well Construction		
5- 5-	1 0-2' 2 2'-4 3 4'-6' 4 6'-8'			0-0.5" - Organic rich 0.5-5" - Silty sand w orangish-brown, da turning light bro 5'-6" - Silt, dark gra	ump to moist	-			
	5 8-10			8'-10' - Silty clay, gro	ay, moist				
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0-						- - 			
5-	:					- - - -			
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Boring /Monitoring Well Log

Page 1 of ___1 ...

	CZIVA													
Clien		Lubr	izol Corporatio	on			WO#: ₀₉	928.00.01		Boring/Well I.D.: GB-			GB-1	17
Proie	٠.		orobe Boring P		 				Well Const	struction Data				
	Jarte	d: 12-20)-96	Date Comp	12-20-		Screen:	NA			From:		To:	
1	ed By:	1V1. D	ARNETT	Checked By	S. DRAGT		Pack:	NA			From:		To:	
1	g Co.:	Spro	wls Drilling	Driller:	D. WRIGH	П	Seal:	NA			From:		To:	
Metho		Geop	orobe	Equipment:	Geoprobe		Grout:	Bentonite		\overline{m}	From:	8'	То:	0
Borin	g Dept	th: 8'	· · · · · · · · · · · · · · · · · · ·	Ground Sur	face Elevation	:	Inner Casi	ing:	NA					
Initial	GW L	evel: ~	4'	GW Level:	Time/	Date	Outer Cas	ing/Stick Up:	NA	NA				
Depth	Sample Type	Sample ID.	Blow Counts	Headspace (ppm)			Remari	ks	Co	Well				
0 5 10 1 20 1 25 1	SI-3	2'-4'			· "	prown, dam brownish- ₁ 4'	p to moist gray @ 2'				-			
30~	.										_			

Supplemental Field Investigation Monitoring Wells

WO No: 09928.00.01	Date Completed		2 Nov 98		
Project Greiner's Lagoon	Owner	Lubrizol			\
Location Fremont, Ohio	Boring Depth (feet)	14'	Diameter	8.25"	
Northing N/A	Surface Elevation		feet msl		7
Easting N/A	Riser Elevation		feet msl		
Screen Slotted PVC	Length (feet)	10'	Diameter	2"	
Slot Size 0.01"	Stabilized DTW	N/A	feet TOC	N/A	
Riser PVC	Length (feet)	14'	Diameter	2"	
Drilling Method Hollow-Stein	Driller	Jeff	Geologist	Susan Dragt	Location Sketch Map
Drillng Company Sprowl's Drilling					

Depth (feet BGS)	Graphic Log	Well	Construction	Schematic	PID Reading (PPM)	Blows per 0.5 feet	Split-Spoon #	Sample Depth (feet BGS)	Recovery	·	Sample Description/Classification
<u></u>		\vdash	Τ	П							
		П								Feet Belov	w Ground Surface
0						2-4-4-5		0-2'		0-2'	Sandy SILT, trace gravel, orange/brown, loose,
				111111							moist to dry, no odor.
						3-2-5-5		2-4'		2-4'	Same as above, but at approximately 4 feet,
											sand zone approximately 6 inches thick, moist.
						4-7-10-12		4-6'		4-6'	As above, but at approximately 5 feet silty CLAY,
5											gray/black, moist.
						8-10-16-16		6-8'		6-8'	SILT, gray/black, moist.
]					
						4-6-6-12		8-10'		8-10'	Silty CLAY, gray/black, moist to wet.
						ļ					
10						3-4-5-6		10-12'		10-12'	As above.
ļi			Ħ			4-6-6-10		12-14'		12-14'	As above.
1									-		
15											End of boring at 14' Below Ground Surface (BGS)
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Environm	MW-10					
WO No: 09928.	00.01	Date Completed		3 Nov 98		
Project Greine	r's Lagoon	Owner	Lubrizol			
Location Fremo	nt, Ohio	Boring Depth (feet)	14	Diameter	8.25"	
Northing N/A		Surface Elevation		feet msl		
asting N/A		Riser Elevation		feet msl		
Screen Slotted	PVC	Length (feet)	10.	Diameter	2"	
Slot Size 0.01*		Stabilized DTW	N.A.	feet TOC	N A	
Riser PVC		Length (feet)	14	Diameter	2*	
Orilling Method	Hollow-Stem	Driller	Jeff	Geologist	Susan Dragt	Location Sketch Map
Drilling Company	Sprowl's Drilling					_

Depth (feet BGS)	Graphic Log	Well	Construction	Schematic	PID Reading (PPM)	Blows per 0.5 feet	Split-Spoon #	Sample Depth (feet 1303)	Recovery		Sample Description/Classification
_	_	-		\blacksquare							
ļ		HI		Н				 -		Feet Beld	ow Ground Surface
0		HI		Н		3-3-6-8		0-2"		0-2'	Sandy SILT, trace gravel, orange/brown, dry.
1			li			3300	_	, , , , , , , , , , , , , , , , , , ,		 -	<u> </u>
					3.8	3-5-4-3		2-4'		2-4'	
· · · · · · · · · · · · · · · · · · ·										1	
						4-7-6-8		4-6'		4-6'	Silty SAND grading to silty clay at approximately
5											5 feet, moist.
					3.6	4-8-11-15		6-8		6-8'	Silty CLAY, gray, moist.
ļ			Ш			ļ		L			
ļ					3.9	10-7-7-10		8-10		8-10	CLAY, gray, moist.
<u>-</u>								10.12	-		
10					3.5	3-4-6-7		10-12		10-12"	As above.
			Ш		3.5	2-4-6-8		12-14'		12-14	As above.
 					ر.ر	2-4-0-6		12-14		12-14	A3 8007C.
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WO No: 09928.00.01	Date Completed			
Project Greiner's Lagoon	Owner	Lubrizol		
Location Fremont, Ohio	Boring Depth (feet)	14'	Diameter	8.25"
Northing N/A	Surface Elevation		feet msl	
Easting N/A	Riser Elevation		feet msl	
Screen Slotted PVC	Length (feet)	10'	Diameter	2"
Slot Size 0.01"	Stabilized DTW	N/A	feet TOC	N/A
Riser PVC	Length (feet)	14'	Diameter	2"
Drilling Method Hollow-Stem	Driller	Jeff	Geologist	Bob Elliott
Drillng Company Sprowl's Drilling	7			

MW-11

Location Sketch Map

Depth (feet BGS)	Graphic Log	Well	Construction	Schematic	PID Reading (PPM)	Blows per 0.5 feet	Split-Spoon #	Sample Depth (feet BGS)	Recovery	s	ample Description/Classification
		Н								**	
		H		r	1				· 	Feet Below	Ground Surface
0				L	<0.1	2-4-6-6		0-2'	50	0-2' S	ILT, little gravel, brown, dry, slightly stiff
		***		××××							rades to light brown.
		QQL	1	×	<0.1	3-4-4-4		2-4'	70		ILT, some sand, brown/grey, mottled, damp,
										fr	riable.
					<0.1	3-4-5-6		4-6'	15		ILT, grey/brown, mottled, damp, slightly friable,
5											-1mm wide fine sand seams at approximately 5.5-
											', 2" apart from each other.
					<0.1	8-5-5-9		6-8'	60		rey/brown, mottled, damp, grades to moist, at
						<u> </u>					pproximately 9.7' fine SAND, not dense, some silt.
					<0.1	3-3-4-5		8-10'	60		ine & Med. SAND, grey, moist, some silt, 2 dark
10			\blacksquare								olored seams at 9.2' and 9.7'.
-					<0.1	2-2-4-2	<u> </u>	10-12'	80		LAY, dark grey, slightly moist, soft, slightly
<u> </u>						0.4.0.0		12.14			lastic, some silt.
			Ħ		<0.1	2-4-2-2		12-14'	5	12-14' C	CLAY, grey, moist, slightly plastic, little silt.
15			-		1	<u> </u>					and of boring at 14' Below Ground Surface (BGS)
'3											and of coming at 14 Delow Glound Surface (DGS)
		_		_							
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										\ <u>\</u>	,
]										

Drilling Method

WO No: 09928.00.01	Date Completed		2 Nov 98		
Project Greiner's Lagoon	Owner	Lubrizol			
Location Fremont, Ohio	Boring Depth (feet)	14"	Diameter	8.25	
Northing N/A	Surface Elevation		feet ms!		
Easting N/A	Riser Elevation		feet msl		
Screen Slotted PVC	Length (feet)	10.	Diameter	2"	
Slot Size 0.01*	Stabilized DTW	N A	feet TOC	N A	
Riser PVC	Length (feet)	14"	Diameter	2*	
Drilling Method Hollow-Stem	Driller	Jeff	Geologist	Bob Elliott	Location Sketch Map

MW-12

Sample Description/Classification Sample Description/Classification Sample Description/Classification	•	Drilling Company Sprowl's Drilling													
Co.1 3-1-11-11 O-2' 70 O-2' SILT, brown, dry, friable, some fine sand.	Depth (feet BGS)	Graphic Log	Well	Well Construction Schematic		Construction Schematic		PID Reading (PPM)	Blows per 0.5 feet	Split-Spoon #	Sample Depth (feet BGS	Recovery		Sample Description/Classification	
Co.1 3-1-11-11 O-2' 70 O-2' SILT, brown, dry, friable, some fine sand.			Н	П											
Co.1 3-1-11-11 O-2' 70 O-2' SILT, brown, dry, friable, some fine sand.			Н		Н	-					Feet Belo	ow Ground Surface			
Coll 2-7-10-8 2-4' 80 2-4' Fine SAND, borwn, dry, slightly dense, some gravel, little silt.	0				Ħ	40.1	3-1-11-11	-	0-2"	70					
2-7-10-8 2-4 80 2-4 Fine SAND, borwn, dry, silgnity dense, some gravel, little silt.				H				·			1				
Coll 3-5-8-12 4-6' 70 4-6' Med. & Fine SAND, brown, damp, loose, some sides Coll 6-8-10-15 6-8' 70 6-7.5' SILT, brown, damp, not dense, some fine sand. 7.5-8' SILT, dark grey to black, slightly moist, not dense some fine sand. Coll 6-5-5-2 8-10' 80 8-10' CLAY & SILT, dark grey, damp, soft, plastic. CLAY, grey, damp, soft, plastic, some silt, at approx. 10.5'- 2mm wide wet med. sand layer. CLAY, grey, damp, soft, plastic, some silt. CLAY, grey, damp, soft, plastic, some silt. End of boring at 14' Below Ground Surface (BGS) End of boring at 1						⊲ 0.1	2-7-10-8		2-4'	80	2-4'	Fine SAND, borwn, dry, slightly dense, some			
S															
Clay & Sill T, dark grey to black, slightly moist, not dense some fine sand. 7.5-8' Sill T, dark grey to black, slightly moist, not dense some fine sand. Clay & Sill T, dark grey, damp, soft, plastic.				Ц		<0.1	3-5-8-12		4-6'	70	4-6'	Med. & Fine SAND, brown, damp, loose, some silt.			
7.5-8' SILT, dark grey to black, slightly moist, not dense some fine sand. 40.1 6-5-5-2 8-10' 80 8-10' CLAY & SILT, dark grey, damp, soft, plastic. 40.1 3-4-7-8 10-12' 80 10-12' CLAY, grey, damp, soft, plastic, some silt, at approx. 10.5'- 2mm wide wet med. sand layer. 40.1 2-3-5-7 12-14' 60 12-14' CLAY, grey, damp, soft, plastic, some silt. End of boring at 14' Below Ground Surface (BGS)	5														
Some fine sand. CLAY & SILT, dark grey, damp, soft, plastic.				Ħ		<0.1	6-8-10-15		6-8	70					
CLAY & SILT, dark grey, damp, soft, plastic. 10				Ħ							7.5-8'				
10															
approx. 10.5'- 2mm wide wet med. sand layer. <0.1 2-3-5-7 12-14' 60 12-14' CLAY, grey, damp, soft, plastic, some silt. 15 End of boring at 14' Below Ground Surface (BGS)				\blacksquare											
 < 0.1 2-3-5-7 12-14' 60 12-14' CLAY, grey, damp, soft, plastic, some silt. End of boring at 14' Below Ground Surface (BGS)	10			Ш		<0.1	3-4-7-8		10-12"	80	10-12				
End of boring at 14' Below Ground Surface (BGS	\vdash						2367	<u> </u>							
	 					<0.1	2-3-5-7		12-14	60	12-14	CLAY, grey, damp, soft, plastic, some sift.			
															
	15				888						 	End of boring at 14' Relaw Ground Surface (PGS)			
20										-	-	LAND OF DOCUME BELLY DEROW OF OURSE SUFFACE (DOS)			
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WO No: 09928.00.01	Date Completed		3 Nov 98		
Project Greiner's Lagoon	Owner	Lubrizol			J
Location Fremont, Ohio	Boring Depth (feet)	14'	Diameter	8.25"	
Northing N/A	Surface Elevation		feet msl		
Easting N/A	Riser Elevation		feet msl		
Screen Slotted PVC	Length (feet)	10'	Diameter	2"	
Slot Size 0.01"	Stabilized DTW	N/A	feet TOC	N/A	
Riser PVC	Length (feet)	14'	Diameter	2"	
Drilling Method Hollow-Stem	Driller	Jeff	Geologist	Susan Dragt	Location Sketch Map
Drillng Company Sprowl's Drilling	3				

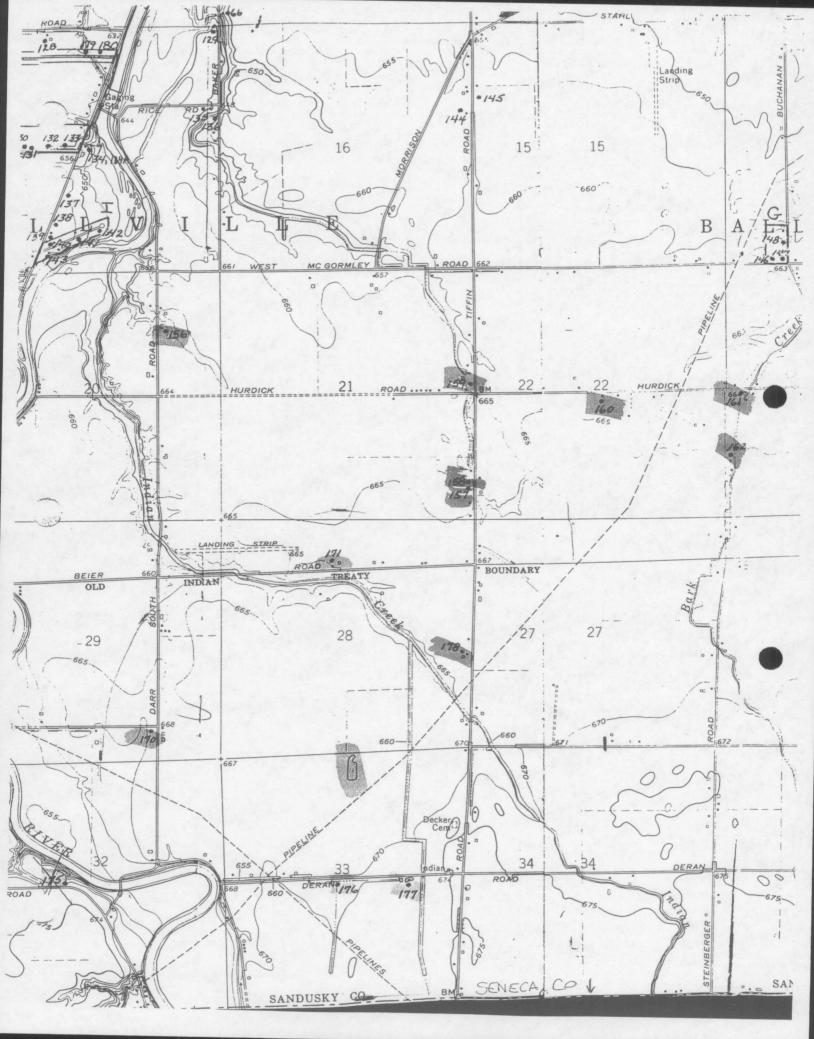
					, i i i i i i						
Depth (feet BGS)	Graphic Log	Well	Construction	Schematic	PID Reading (PPM)	Blows per 0.5 feet	Split-Spoon #	Sample Depth (feet BGS)	Recovery		Sample Description/Classification
		F	1 1	1							
		Н		Н						Feet Belo	ow Ground Surface
0						1-3-3-5		0-2'		0-2'	Sandy SILT, orange/brown, dry.
				11111							
			i i			3-5-9-9		2-4'		2-4'	SAND, fine to med. grained, some silt, brown,
ļi		888	Ц	388		2 5 11 12				1.0	moist to dry, no odors.
			Ħ			3-7-11-13		4-6'		4-6'	As above, but becoming wet.
5				H		3-9-9-9		6-8'	-	6-8'	As above, but turning gray/black, organic odor.
						3.3.3.3				-	713 20070, Out turning gray/black, organic odor.
					20.0	3-6-6-8		8-10'		8-10'	Sandy SILT with CLAY, gray/black, moist to wet.
10			Ħ		9.0	4-4-10-13		10-12'		10-12'	CLAY, gray, moist.
									_		
					7.0	2-4-4-7		12-14'		12-14'	As above.
			Ħ				<u> </u>	ļ		 	
15					-		<u> </u>			 	End of boring at 14' Below Ground Surface (BGS)
				ᅱ						 	Zana or borning at 1 1 Borom Ground Sarrace (BOS)
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WO No: 09928.00.01	Date Completed		2 Nov 98		
Project Greiner's Lagoon	Owner	Lubrizol			
Location Fremont, Ohio	Boring Depth (feet)	14	Diameter	8.25*	
Northing N/A	Surface Elevation		feet msl		
Easting N.A.	Riser Elevation		feet msl		
Screen Slotted PVC	Length (feet)	10	Diameter	2-	
Slot Size 0.01*	Stabilized DTW	N A	feet TOC	N A	
Riser PVC	Length (feet)	14"	Diameter	2"	
Drilling Method Hollow-Stem	Driller	Jeff:	Geologist _	Susan Dragt	Location Sketch Map
Drilling Company Sprowl's Drilling					

MW-14

Depth (feet BGS)	Graphic 1.0g	Well	Construction	Schematic	PID Reading (PPM)	Blows per 0.5 feet	Split-Spoon #	Sample Depth (feet BGS)	Recovery		Sample Description/Classification
		Н	11	┪						<u> </u>	
		Н		Н					-	Feet Belo	ow Ground Surface
0		Ħ		Ц		1-2-3-4		0-2		0-2"	Silty SAND, trace gravel, orange/brown, moist
			H	11111						<u> </u>	to dry.
		N.	▋▐	17		3-2-2-5		2-4'		2-4'	As above.
			Ц			3-6-9-2		4-6'		4-5'	Fine to Med. SAND, moist to wet, gray/brown.
5										5-6'	SILT, gray/brown, moist.
						9-18-26-25		6-8'		6-8'	SILT, as above, moist to wet.
-						1665					
						4-6-6- 7		8-10"		8-10"	Silty CLAY, dark gray, moist to wet.
10			Ħ			2-4-6-7		10-12"		10-12'	As above.
10	-				_	2-4-0-/		10-12		10-12	AS 800VC.
			Ħ			2-3-4-8		12-14'		12-14'	CLAY, gray, moist.
-						2340		12-14		12-14	CEATT, gray, moise
			Ħ							 	
15			Ħ			<u> </u>		 			End of boring at 14' Below Ground Surface (BGS)
			Ħ						_		
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20											
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				!							

Appendix B ODNR Well Logs



ORIGINAL

State of Ohio DEPARTMENT OF NATURAL RESOURCES Division of Water

136431

Columbus, Ohio

Section of Township Section of Township 20 CONSTRUCTION DETAILS PUMPING TEST Length of casing 30 Pumping rate # G.P.M. Duration of test hrs Drawdown ft. Date 13 - 9 - 5% Type of screen.....Length of screen..... Developed capacity Type of pump..... Static level—depth to water 22 ft Capacity of pump..... epth of pump setting..... Pump installed by..... WELL LOG SKETCH SHOWING LOCATION **Formations** Locate in reference to numbered Sandstone, shale, limestone, From To State Highways, St. Intersections, County roads, etc. gravel and clay 0 Feet ___Ft. S.

Drilling Firm.

See reverse side for instructions

WELL 'OG AND DRILLING REPC'T

ORIGINAL

NO CARBON PAPER NECESSARY-SELF-TRANSCRIBING State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

7 550494 , T AK

NON-RESPONSIVE

CONSTRUCTION D	ETAILS		BAILING OR PUMPING TEST (specify one by circling)		
Casing diameter 5" Leng	th of casing_	72	Test rate		
Type of screen Leng	jth of screen _		Drawdown 71544 ft Date		
Type of pump			Static level (depth to water) 30		
Capacity of pump			Quality (clear, cloudy, taste, odor)		
Depth of pump setting		<u>-</u>			
Deta of completion			Pump installed by		
WELL LOG)		SKETCH SHOWING LOCATION		
Formations: sandstone, shale, limestone, gravel, clay	From	То	Locate in reference to numbered state highways, street intersections, county roads, etc.		
- Chy	0 ft	17 tt	NON DECDONONE		
Gress Class	17	58	NON-RESPONSIVE		
Lend	58	72			
Limestone	72	92			
		Ì			
		-			
	···	<u> </u>			
			5		
DRILLING FIRM amel It	un wel	el phlg	DATE8/16/79		
クノフェババト	Janual		la la la la la la la la la la la la la l		
ADDRESS 11 P. Der Sam		olio	SIGNED		
of edditional space is needed to			consecutive numbered form.		

WELL OG AND DRILLING REPC T

ORIGINAL

NO CARBON PAPER NECESSARY-SELF-TRANSCRIBING State of Ohio
DEPARTMENT OF NATURAL RESOURCES

Division of Geological Survey

Fountain Square Columbus, Ohio 43224 Phone (614) 466-5344

479452 35 DV

COUNTY SANCLUSE	TOWNSHIP	Bolly 1/2	SECTION OF TOWNSHIP OR LOT NUMBER 21/12			
CONSTRUCTION	ETAILS		BAILING OR PUMPING TEST (specify one by circling)			
Type of screen Len	gth of casing		Test rate 2 s gpm Duration of test 1 Drawdown 10 ft Date 9-13-79 Static level (depth to water) 2 2 Quality (clear, cloudy, taste, odor) Apacars 6-21 Pump installed by 1-6-21-5 Well Dr. Inc			
WELL LOG	•		SKETCH SHOWING LOCATION			
Formations: sandstone, shale, limestone, gravel, clay	From	То	Locate in reference to numbered state highways, street intersections, county roads, etc.			
Sindy Clay Ginel Blac Clay Gravel himestone	0 ft 4 10 45 57	y ft 10 45 57 28	NON-RESPONSIVI			

TIBBOLES WELL DRILLING, ADDRESS MELL DRILLING FIRM R.R.3 Dellevue, Ohio 44311

SIGNED

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^{*}If additional space is needed to complete well log, use next consecutive numbered form.

WELL OG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY-SELF-TRANSCRIBING State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

550480

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OUNTY.	Si	Sud	us	y	TOWNS	HIP_
	_		•	m		

Ballville

SECTION OF TOWNSHIP

21

LOCATION OF PROPERTY					
CONSTRUCTION	DETAILS		BAILING OR PUMPING TEST (specify one by circling)		
Casing diameter	gth of casing_	67'	Test rate		
Type of screen Len	gth of screen		Drawdown ft Date		
Type of pump			Static level (depth to water)		
Capacity of pump	<u> </u>		Quality (clear, cloudy, taste, odor)		
Depth of pump setting					
Date of completion			Pump installed by		
WELL LOG	•		SKETCH SHOWING LOCATION		
Formations: sandstone, shale, limestone, gravel, clay	From	То	Locate in reference to numbered state highways, street intersections, county roads, etc.		
~ Chy	0 ft	12 tt	NON-RESPONSIVE		
. a fail	12	28	INOIN INLOI CINOIVE		
Gray Clay	18	54			
Broken findstone	54	67			
Limestone	67	87			
			- -		
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SIGNED.

Olf additional space is needed to complete well log, use next consecutive numbered form.

WELL LOG AND DRILLING REPORT

PLEASE USE PENCIL OR TYPEWRITER. DO NOT USE INK.

State of Ohio
DEPARTMENT OF NATURAL RESOURCES

Division of Water 1562 W. First Avenue Columbus, Ohio

85

No. 237301

7.7 6:

ON-RESPONSIVE

County SANDUS Township BALL VILLE Section of Township

CONSTRUCTION	DETAILS		BAILING OR PUMPING TEST		
Type of screen Len Type of pump Capacity of pump	gth of scree	n	Pumping rate		
WELL LO			SKETCH SHOWING LOCATION		
Formations Sandstone, shale, limestone, gravel and clay	From	То	Locate in reference to numbered State Highways, St. Intersections, County roads, etc.		
Chay LIMKSTINK	0 Feet	20 Ft.	NON-RESPONSIV		

WELL '.OG AND DRILLING REPC'T

ORIGINAL

NO CARBON PAPER NECESSARY-SELF-TRANSCRIBING

State of Ohio DEPARTMENT OF NATURAL RESOURCES Division of Water

65 S. Front St., Rm. 815

Phone (614) 469-2646

Columbus, Ohio 43215 Township Ballwille Section of Township

	DETAILS		(Specify one by circling)
Lesing diameter 4/4 Len			Test Rate 13 G.P.M. Duration of test
ype of pump			Static level-depth to water 60
apacity of pump			Quality (clear, cloudy, taste, odor) Clear
epth of pump setting	···		
ete of completion	- ·		Pump installed by
WELL LO	G ≉		SKETCH SHOWING LOCATION
Formations Sandstone, shale, limestone, gravel and clay	From	To	Locate in reference to numbered State Highways, St. Intersections, County roads, etc.
Pay : Hellow	0 Feet	₹ Ft.	N.
Hand	5	48	NON-RESPONSIVE
Blue	48	87	
Lime Stone	87	116	
			
Water at 97			w.
1/8			
	·•		

Drilling Firm Field			Date Ruguet 18, 1973 Signed Gaymond Field
Address			Signed Taymond Field =

ORIGINAL

NO CARBON PAPER NECESSARY -SELF-TRANSCRIBING

DRILLING FIRM

ADDRESS.

State of Ohio DEPARTMENT OF NATURAL RESOURCES Division of Geological Survey

Fountain Square Columbus, Ohio 43224

Phone (614) 466-5344

SECTION OF TOWNSHIP

488475

CONSTRUCTION	DETAILS		(specify one by circling) Test rate gpm		
Casing diameter 55% "Ler	ngth of casing_	86'			
	ngth of screen.		Drawdown 20 ft Date 7-15-75		
Type of pump Deep Well			Static level (depth to water)		
Canacity of numn			Quality (clear, cloudy, taste, odor) Appeas Cool		
Pepth of pump setting					
Date of completion 7-/5-75		 	Pump installed by		
WELL LO) •		SKETCH SHOWING LOCATION		
Formations: sandstone, shale, limestone, gravel, clay	From	То	Locate in reference to numbered state highways, street intersections, county roads, etc.		
Some	0 ft	10 ft	NON DEODONOU		
Blue On	10	65	NON-RESPONSIV		
Blue Chan a lacarel	65	75			
Comel	75	84	i l		
1 me stone	84	100			
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SIGNED

*If additional space is needed to complete well log, use next consecutive numbered form.

WELF OG AND DRILLING REP' T

ORIGINAL

NO CARBON PAPER NECESSARY-SELF-TRANSCRIBING

State of Ohio DEPARTMENT OF NATURAL RESOURCES Division of Water Fountain Square Columbus, Ohio 43224

0 10 06.

SECTION OF TOWNSHIP.

COUNTY_	sanden 124	TOWNSHIP	DALLY	ull
				\

CONSTRUCTION I	DETAIL\$		BAILING OR PUMPING TEST (specify one by circling)		
Casing diameter	gth of screen _		- <u> </u>		
Formations: sendstone, shale, limestone, gravel, clay	From	То	Locate in reference to numbered state highways, street intersections, county roeds, etc.		
- Chy finestone	0 ft	18 ft 45	NON-RESPONSIVE		

SIGNED.

Olf additional space is needed to complete well log, use next consecutive numbered form,

PLEASE USE PENCIL OR TYPEWRITER. DO NOT USE INK.

State of Ohio DEPARTMENT OF NATURAL RESOURCES Division of Water 1562 W. First Avenue Columbus, Ohio

No. 269815

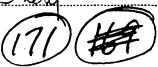
Township Fallville Section of Township 28 County Sandusky

CONSTRUCTION DETAILS			BAILING OR PUMPING TEST
Casing diameter Length of casing61			Pumping rate18G.P.M. Duration of testhrs
Type of screenLen	gth of scree	n,	Drawdown 5 ft. Date 4 - 9 - 62
			Developed capacity
Capacity of pump	***************************************	•••••••	Static level—depth to water 30
Depth of pump setting	•,		Pump installed by
Late of completion			
WELL LO	G		SKETCH SHOWING LOCATION
Formations Sandstone, shale, limestone, gravel and clay	From	То	Locate in reference to numbered State Highways, St. Intersections, County roads, etc.
Clay Sand Clay Lime Stone Water \$1 65	0 Feet 7 21 58	7Ft. 21 58 70	NON-RESPONSIVE W
	. •		See reverse side for instructions

RAYMOND FIELD Drilling Firm WELL DRILLING 742 S. Sandusky St.

Date April 9 1962

Signed Of au month



WEL' 'OG AND DRILLING REP

ORIGINAL

NO CARBON PAPER NECESSARY-SELF-TRANSCRIBING

State of Ohio DEPARTMENT OF NATURAL RESOURCES Division of Water Fountain Square Columbus, Ohio 43224

SECTION OF TOWNSHIP.

Type of screen Length of screen Drawdown 5 ft				BAILING OR PUMPING TEST (specify on sy circling)	
Depth of pump setting Dete of completion WELL LOG® SKETCH SHOWING LOGATION Formations: sandstone, shale, limestone, gravel, clay Oft 17 ft Grafen Limestone Broken Limestone 34' 45'				Test rate	
Date of completion Pump installed by SKETCH SNOWING LOCATION Formations: sandstone, shale, I limestone, gravel, clay Oft 17 ft Broken Limestone 34' 45'				Ouality (cleer, cloudy, taste, odor) ———————————————————————————————————	
Formations: sandstone, shale, I from To Locate in reference to numbered state highways, street intersections, county roads, etc. Clay 0 ft 17 ft NON-RESPONS V Grahen Livelance 34' 45'	•				
Clay Oft 17 ft When Chy 17 34' Broken Livelane 34' 45'	WELL LOG	;•			
Broken Lineaver 34' 45'		From	То		
	Gley Chy Broken finedone Jemestone	17 34'	34 ⁻	NON-RESPONSIVE	

SIGNED_

*If additional space is needed to complete well log, use next consecutive numbered form.

7 ORIGINAL

NO CARBON PAPER
NECESSARY—
SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water

65 S. Front St., Rm. 815 Phone (Columbus, Ohio 43215

Phone (614) 469-2646

No. 376758

ok.

County Ruding Township

Dellwille Section of Township.

<u>33</u>

NON-RESPONSIVE

CONSTRUCTION DETAILS Casing diameter			BAILING OR PUMPING TEST (Specify one by circling)
			Test RateG.P.M. Duration of testhrs.
			Drawdown new ft. Date
			Static level-depth to water 32' ft.
Capacity of pump			Quality (clear, cloudy, taste, odor)
7th of pump setting			***************************************
Date of completion	*******************		Pump installed by SKETCH SHOWING LOCATION
WELL LO)G*		
Formations Sandstone, shale, limestone, gravel and clay	From	То	Locate in reference to numbered State Highways, St. Intersections, County roads, etc.
) 1 /a.,	0 Feet	y Ft.	N.
Luce	' ابز	53'	NON-RESPONSIVE
Land & Kroud	63'	<i>i 1</i> 7	
			
		ı	W
			₩.
Drilling Firm My 4 VI	66 Bai	16, 9	Date Novil 8 /68
Dia Chill Mi			
Address // 2 · U	- intell	J. J. J.	Signed trull brees [17]
*If additional space is ne	eded to co	mplete v	vell log, use next consecutive numbered form.

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State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Columbus, Ohio

Nº .96708

County Sandusky

Township Ballville

Section of Township 28

28 H

NON-RESPONSIVE

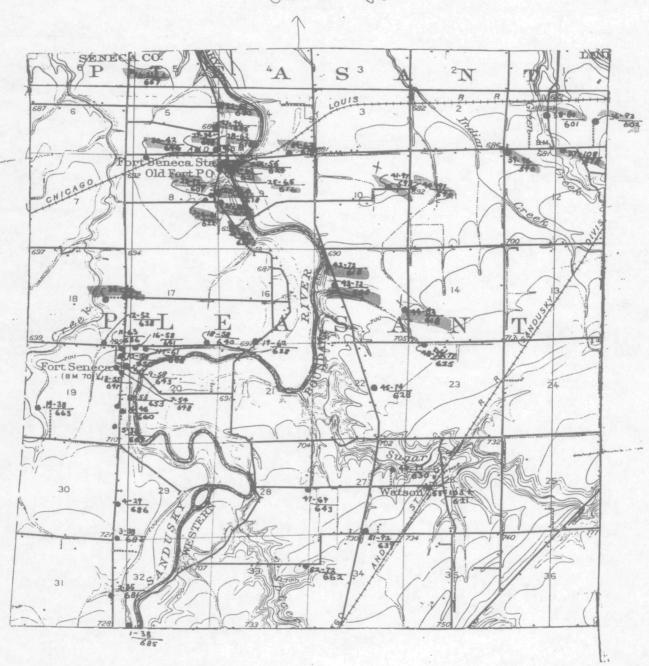
CONSTRUCTION DETAILS			PUMPING TEST		
Casing diameter 4/4 Leng Type of screen Leng Type of pump Capacity of pump Depth of pump setting	th of screen.		Developed capacity	Date 18	
WELL LO	3		SKETCH SHOWING LOCATION		
Formations Sandstone, shale, limestone, gravel and clay	From	To	Locate in referer State Highways, St. Inters	nce to numbered ections, County roads, etc.	
Jop soil yelko sand Clay Blue Clay Rock	0 Peet / / / / / / / / / / / / /	14 14 56 71	NON-RES	PONSIVE	
Water at 65-70					

Address Trans Ohio

Date Clug - 52
Signed Fount Arones

178

SANDUSKY CO



Seneca Co., Pleasant Twp.





WELL LOG AND DRILLING REPORT

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NO.	 <u>5</u>	3	58	15

CONSTRUCTION DET	AILS		BAILING OR PUMPING TEST
Casing diameter 41/4 Leng	th of casi	ng_7;	Pumping rate G.P.
Type of screenLeng	th of scre	en	Duration of test hrs
Type of pump			Drawdown ft. Date 1-51
Capacity of pump	······································		Developed capacity
Depth of pump setting			Static level - depth to water 25 f
Date of completion			Pump installed by
WELL LOG		!	SKETCH SHOWING LOCATION
Formation	From	To	N.
top soil	6	14_	
yel sand + clay		8	
quicksand	# 1	11	
bl. clay		60	W.
hard pan		69	
shell rock		77	
shelly rock + will	dy	125	•
10 C			
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WEJ LOG AND DRILLING REPORT

2/ 70 By ORIGINAL



State of Ohio
DEPARTMENT OF NATURAL RESOURCES

Division of Water 1500 Dublin Road Columbus, Ohio

Z/ No. 201552

County CCA Township D/PASA17 Section of Township
--

NON-RESPONSIVE

CONSTRUCTION	DETAILS		BAILING OR PUMPING TEST
			Pumping rateG.P.M. Duration of testhrs. Drawdownft. Date
			Developed capacity
			Static level—depth to water 26 ft.
			Pump installed by
vate of completion			1
WELL LO			SKETCH SHOWING LOCATION
Formations Sandstone, shale, limestone, gravel and clay	From	То	Locate in reference to numbered State Highways, St. Intersections, County roads, etc.
Sand Clay gravel Joy Shale Linustone	0 Feet 26 55' 70' 77'	35 Ft. 70' 77"	W. S. See reverse side for instruction

Address A 2 Lybra 6

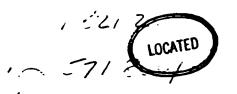
Date May 6, 1957 LOCATED

Signed William O Cleaney viving

PH 51

W"'L LOG AND DRILLING REPOPT

22 64 By



State of Ohio
DEPARTMENT OF NATURAL RESOURCES

Division of Water Columbus, Ohio

CES 12723

County SENECO

Township Pleasant

Section of Township ...or Lot Number.....

NON-RESPONSIVE

CONSTRUCTION DETAILS			PUMPING TEST
Casing diameter Lengt	h of casing	76'	Pumping rateG.P.M. Duration of test
Type of screenLengt	_	Drawdown ft. Date	
Type of pump		Developed capacity	
Capacity of pump			Static level—depth to water 29
Depth of pump setting	***********	Pump installed by	
WELL LOG			SKETCH SHOWING LOCATION
Formations Sandstone, shale, limestone, gravel and clay	From	То	Locate in reference to numbered State Highways, St. Intersections, County roads, etc
SAND	0 Feet	_7_Ft	N.
ZiA/	7	69	
ShALE	64	67	
LIACSTONF	67	160	
Nach al. 188 130 154			w .
Drilling Firm W.R.	Ding.	<i>y</i> -	See reverse side for instructions Date Signed A Signed

23 73 BF

ORIGINAL

57/ CLOCATED

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Columbus, Ohio

Nº 89285 23

County Sensor Township Place & Section of Township #8 or Lot Number OF SESPONS

CONSTRUCTION I	DETAILS		PUMPING TEST
Casing diameter 4'4 Length of casing 744 Type of screen Length of screen Type of pump capacity of pump pth of pump setting WELL LOG			Developed capacity
			SKETCH SHOWING LOCATION
Formations Sandstone, shale, limestone, gravel and clay	From	То	Locate in reference to numbered State Highways, St. Intersections, County roads, etc.
Jop soul yellow clay Blue clay Rock Water at 90-96	0 Feet / # /0 73	7.3 7.8	N. NON-RESPONSIVE W. S. See reverse side for instructions 23
Drilling Firm Fourest &	Ohn		Date Mar 1952 LOCATED Signed 7 mest force

WF'L LOG AND DRILLING REPORT

State of Ohio DEPARTMENT OF NATURAL RESOURCES

Division of Water Columbus, Ohio

PLEASANT Section of Township

CONSTRUCTION I	DETAILS		PUMPING TEST
Casing diameter 4 4 Length of casing 6.5 2 Type of screen Length of screen Capacity of pump Depth of pump setting			Drawdown ft. Date Developed capacity Static level—depth to water 2 4
WELL LO	G		SKETCH SHOWING LOCATION
Formations Sandstone, shale, limestone, gravel and clay	From	То	Locate in reference to numbered State Highways, St. Intersections, County roads, etc.
Land	0 Feet	_/OFt	N.
Limeston	10	120	NON-RESPONSIVE
infile .			
954 MI 19181			
· 新 () ()			See reverse side for instructions
Drilling Firm W.R	Hing		Date 2 17, 1955

ORIGINAL

State of Ohio EPARTMENT OF NATURAL RESOURCES Division of Water Columbus, Ohio

25 Nº 115133

Section of Township $\# \mathcal{E}$

CONSTRUCTION	DETAILS		PUMPING TEST	
Casing diameter 4/4 Leng Type of screen Leng Type of pump Capacity of pump	th of screen.		Pumping rate	
WELL LOG			SKETCH SHOWING LOCATION	
Formations Sandstone, shale, limestone, gravel and clay	From	То	Locate in reference to numbered State Highways, St. Intersections, County roads, etc.	
Jop soul yellow sand Blue Clay Rock Water at 84-90	0 Feet	11 13 65 92	NON-RESPONSIVE w.	
			S. See reverse side for instructions	

Date

Signed!

ORIGINAL

7-57900 (LOOSTED)

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water

Columbus, Ohio

26 Nº

89288

Township Plan +

Section of Township #5

NON-RESPONSIVE

Pumping rate
Locate in reference to numbered
State Highways, St. Intersections, County roads, etc. NON-RESPONSIVE

Address Transport Jones

Address Transport

Date 74 on 1952

gned Forest Jones

S.
See reverse side for instructions

LOCATED

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WELL LOG AND DRILLING REPORT 575000/

27 46 80 ORIGINAL

State of Ohio
EPARTMENT OF NATURAL RESOURCES Division of Water Columbus, Ohio

89253

Section of Township # 6

CONSTRUCTION DETAILS			PUMPING TEST	
Casing diameter 44 Leng Type of screen Leng Type of pump Capacity of pump pth of pump setting	th of screen.	•••••••••••••••••••••••••••••••••••••••	Static level—depth to water 28 ft	
WELL LOC	3 ,		SKETCH SHOWING LOCATION	
Formations Sandstone, shale, limestone, gravel and clay	From	То	Locate in reference to numbered State Highways, St. Intersections, County roads, etc.	
Jos soil Guek Guek Gellow Clay Blue Rock Water at 71-75	0 Feet 1 1/4 4 5 1 4 46	1½ Ft. 4 5 14 46 78	NON-RESPONSIVE W See reverse side for instructions	

Drilling Firm FORREST WONES

29 62 Rp

State of Ohio MENT OF NATURAL RESOURCES Division of Water

28 Nº 115103

Section of Township 72.5

CONSTRUCTION	DETAILS		PUMPING TEST	
Casing diameter 44 Length of casing 63 Type of screen Length of screen Type of pump Capacity of pump Depth of pump setting			Developed capacity Static level—depth to water 32	
WELL LOG			SKETCH SHOWING LOCATION	
Formations Sandstone, shale, limestone, gravel and clay	From	To	Locate in reference to numbered State Highways, St. Intersections, County roads, etc.	
Gellow sand Blue !! Book	0 Feet 1 5 12 62	12 63 94	NON-RESPONSIVE	
lvater at 85-92			W.	

Jansas Ohw

WELL LOG AND DRILLING REPORT

ORT $29\frac{34}{48}$ Property 29

ORIGINAL

LOGNED

State of Ohio
RTMENT OF NATURAL RESOURCES
Division of Water
Columbus, Ohio

79 N

89286

County Senera Township Please &

Section of Township #5

NON-RESPONSIVE

Construction details Casing diameter 4/4. Length of casing 37/4. Type of screen. Length of screen. Type of pump Capacity of pump th of pump setting			Developed capacity Static level—depth to water 22 ft.	
Formations Sandstone, shale, limestone, gravel and clay	From	То	Locate in reference to numbered State Highways, St. Intersections, County roads, etc.	
gravel and clay Sop soul Gellow Clay Blue Rock	0 Feet 1 8 34	8 34 75	N. NON-RESPONSIVE See reverse side for instructions	

Drilling Firm Forcet Jones

Date Mar. 1952

at Jones

LOCATED

1 CH 51

30 42 Bp

ORIGINA

17172 -

State of Ohio
PARTMENT OF NATURAL RESOURCES
Division of Water
Columbus, Ohio

30

Nº 102407

County

..... Township....i

Section of Township or Lot Number.....

NON-RESPONSIVE

CONSTRUCTION	DETAILS	PUMPING TEST	
Type of screen			
WELL LO)G	SKETCH SHOWING LOCATION	
Formations Sandstone, shale, limestone, gravel and clay	From To	Locate in reference to numbered State Highways, St. Intersections, County roads, etc.	
June /	0 Peet		

S. See reverse side for instructions

Drilling Firm

Date Cetich

LOCATED

PEFASANTI KO



W' LOG AND DRILLING REPORT

31 56 By ORIGINA

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Columbus, Ohio

→ Nº 173842

NON-RESPONSIVE

CONSTRUCTION DETAILS Casing diameter 14 Length of casing 59 Type of screen Length of screen Type of pump Capacity of pump Depth of pump setting			PUMPING TEST		
			Developed capacity		
WELL LOG			SKETCH SHOWING LOCATION		
Formations Sandstone, shale, limestone, gravel and clay	From	То	Locate in reference to numbered State Highways, St. Intersections, County roads, etc.		
John Sand Juck !! Blue Clay Rock	0 Feet / & / C 5 6	10 56 109	NON-RESPONSIVE w.		
83413339			S.		
12464 FF01557	a		See reverse side for instructions LOCATED		
Drilling Firm FCPREST Address Dianes			Signed Torrest Jones		

13215 (LOCATED)

WF' '. LOG AND DRILLING REPORT

= 30 Bp

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water

Division of Water Columbus, Ohio 32 N9

96014

ORIGINAL

County SENECA Township REMANT or Lot Number

CONSTRUCTION	DETAILS		PUMPING TEST	
			Static level—depth to water 25 ft	
WELL LO	G		SKETCH SHOWING LOCATION	
Formations Sandstone, shale, limestone, gravel and clay	Prom	To	Locate in reference to numbered State Highways, St. Intersections, County roads, etc.	
- CLAY	0 Feet	50 Et.	N.	

NON-RESPONSIVE E.

S. See reverse side for instructions

Drilling Firm Ace Drilling 6.	D
Drilling Firm Lee Dulling 6. Address 1200 Silvell Tor-Franct, die	Si

Signed Sither King

LOCATED LOCATED

Twing 1 7- 7.7

W.

WEI I. LOG AND DRILLING REPORT

State of Ohio DEPARTMENT OF NATURAL RESOURCES Division of Water

Columbus, Ohio

33 Nº 120522

County.

Township Section of Township or Lot Number

Casing diameter Length of casing 7 Pumping rate G.P.M. Type of screen	Date May 31 40 ft ING LOCATION
Type of screen Length of screen Drawdown Lower ft. Type of pump Developed capacity Static level—depth to water pth of pump setting Pump installed by SKETCH SHOW Formations Sandstone, shale, limestone, gravel and clay 0 Feet 10 Ft. 10 15 20 Formations State Highways, St. Intersection of the state Highways and clay 15 20 Formations State Highways St. Intersection of the state Highway St. Intersection of the state Highway St. Intersection of	ING LOCATION
Sandstone, shale, limestone, gravel and clay O Feet OFECT OFECT OFECT OFECT OFECT OFECT OFECT OFECT OFECT OFECT OFT OFECT OFECT OFECT OFECT OFECT OFECT OFECT OFECT OFECT OFT OFECT OFT OFECT OFT OFECT OFT OFT OFT OFT OFT OFT OFT O	nce to numbered
Plue Plan 15 20 Jana 20 27	sections, County roads, etc.
Drilling Firm W: Sale Cerana Date Man 3/	PONSIVI LOCATED for instructions

W' LOG AND DRILLING REPORT

34 62 CORIGINAL

State of Ohio
DEPARTMENT OF NATURAL RESOURCES Division of Water Columbus, Ohio

39 No 110668

Section of Township

			YOIV L	
CONSTRUCTION	DETAILS		PUMPING TEST	
Casing diameter ———————————————————————————————————				
WELL LO)G		SKETCH SHOWING LOCATION	
Formations Sandstone, shale, limestone, gravel and clay Plue Sand Plue Sand Plue Sand Plue Sand	0 Feet 0 10 38 55	To Fr. 10 38 55 62 69	Locate in reference to numbered State Highways. St. Intersections, County roads, etc. N. NON-RESPONSIVE	
water at 65 gg	6 2	,	W.	
			S. See reverse side for instructions	

Signed ...

SP 57

WF''. LOG AND DRILLING REPORT

State of Ohio OHIO WATER RESOURCES BOARD Department of Public Works

553 E. Broad St., Columbus 15, Ohio

58675

County SENECA Township PLEASANT Section of Township

SEC 18

CONSTRUCTION DETAILS Casing diameter 44 Length of casing 46 Type of screen NONE Length of screen Type of pump NONE Capacity of pump pth of pump setting WELL LOG			PUMPING TEST		
			Static level of completed well ft.		
SAND CLAY GRAVEL CLAY CLAY CLAY CLAY LIMESTONE WATER AT 54' AND 87'	0 Feet 6 8 18 34 44 46	8 28 34 44 46 90	NON-RESPONSIVE w.		

Drilling Firm W S BURNS

Address 92 MADISON ST TIFF1N
OHIO

36



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WELL LOG AND DRILLING REPORT

NO. 40357

NON-RESPONSIVE

Type of screenLength of screen Type of pump Capacity of pump Depth of pump setting			Pumping rate //000 G.P.F.		
			Drawdown Noveft. Date 5-29-48		
			Developed capacity		
			Static level - depth to water 4 ft	5 <u>.</u>	
			Pump installed by		
			WELL I	.OG	
Pormation ,	From	To	n.		
yel sand	а	12			
bl. clay		80			
gravel '		93			
ss ?	1	94			
			W. E	i •	
Drilling Firm H.	Tibboles	·	S. Date S-1-60		
	11000162			~	
Address			Copied by	$\overline{}$	

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WELL LOG AND DRILLING REPORT

NO. 69740

County Deve	ca. Township		leasant	Section of Townshi	p 12
NON-	-RE	S	PO	NSI'	VE
CONSTRUCTI	ON DETAILS		BAIL	ING OR PUMPING TEST	
Casing diameter 4/	Length of casi	ng_//4	Pumping rate_		G.P.M.
Type of screen_	Length of scre	en	Duration of t	est	hrs.
Type of pump			Drawdown	ft. Date	کرن >
Capacity of pump			Developed cap	acity	
Depth of pump setting	ng		Static level	- depth to water	/5_ft
Date of completion_			Pump installe	d by	
		,			
WELL			SKETC	H SHOWING LOCATION	
Formation	From	То		N.	
clari	0	90			
Sand Ls.	900	1			
_ 4.	103-	/25			
		}	w.		E
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		ĺ			
er kaja men nagaraga, gan germen Majarka i Afrika kananan ja najaragan jagan maja di dalam Maja dipada m				s.	
Drilling Firm K.	y Drilling		Date	3-1-60)
Address	•	1		ed by RC	_

LOG AND DRILLING REPORT 33 30 30

State of Ohio

PARTMENT OF NATURAL RESOURCES

Division of Water 1500 Dublin Road Columbus, Ohio

38 No. 184701

PI-BCAN/

CONSTRUCTION	DETAILS		BAILING OR PUMPING TEST		
Casing diameter 4"4 Length of casing 97"			Pumping rate	Duration of testhrs	
Type of screen Len	gth of screen	r	Drawdownft. Da	ıte	
Type of pump					
Capacity of pump		S	Static level-depth to water	/5 ⁻ ft	
Depth of pump setting					
ate of completion.					
WELL LO)G		SKETCH SHOWI	ING LOCATION	
Formations Sandstone, shale, limestone, gravel and clay	From	To	Locate in referen State Highways, St. Interse		
CLAY SHALE LIMESTONE WATER AT 103'	7 14 8 9 9 9 10	O	NON-RES	PONSIVE	
• •	1		See reverse side	for instructions	

Drilling Firm W. R

Signed .

State of Ohio DEPARTMENT OF NATURAL RESOURCES

Division of Water 1500 Dublin Road Columbus, Ohio

No. 199058

CONSTRUCTION DETAILS			BAILING OR PUMPING TEST		
Casing diameter 4/4 Leng	th of casing	g 98	Pumping rate G.P.M. Duration of testhrs.		
Type of screenLeng			Drawdownft. Date		
Type of pump			Developed capacity		
Capacity of pump			Static level—depth to waterft.		
tpth of pump setting			Pump installed by		
ate of completion	***************************************	****************			
WELL LOG			SKETCH SHOWING LOCATION		
Formations Sandstone, shale, limestone, gravel and clay	From	То	Locate in reference to numbered State Highways, St. Intersections, County roads, etc.		
Jellon-Clay Geneb Soul + Shend Hard Pan Clay Rock Water at 100-106	0 Feet 1/2 14 85 87 96	14 85 87 96 108	NON-RESPONSIVE w.		
Drilling Firm + CRREST	1 CN/	•	S. See reverse side for instructions Date Chi - 5-7 LOCATED		

WF' LOG AND DRILLING REPORT

1 72 Chanton

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Columbus, Ohio

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96731

County Section of Township & 11.

Township Clease & Section of Township & 11.

CONSTRUCTION	DETAILS		PUMPING TEST			
Casing diameter 4/4 Length of casing /01/2 Type of screen Length of screen Type of pump Capacity of pump Depth of pump setting			Drawdown ft. Date Developed capacity Static level—depth to water 36			
WELL LO	G	SKETCH SHOWING LOCATION				
Formations Sandstone, shale, limestone, gravel and clay	From	To	Locate in reference to numbered State Highways, St. Intersections, County roads, etc.			
Jop soil plow soul ochy Blue Clay Trond Pan Guick Sand HordPan & Grand Rock Water at 108-112	1 Feet 1 / 2 14 30 50 57 97	1/2 Pt 14 30 50 55 97 114	N. NON-RESPONSIVE W.			
			S.			

See reverse side for instructions

Drilling Pirm FORREST JONES

Address Transas Olus

Signed Fourt Jones LOCATED

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WELL LCG AND DRILLING REPORT

41

NO. 52459

CONSTRUCTION DETA	ILS		BAILING OR	PUMPING TEST	
Casing diameterLengt	h of casi	ng	Pumping rate		G.P.M.
Type of screen Lengt	h of scre	en	Duration of test		hrs.
Type of pump			Drawdown ft.	Date	* jø
Capacity of pump			Developed capacity		
Depth of pump setting			Static level - depth	to water	ft.
Date of completion			Pump installed by		
					· · · · · · · · · · · · · · · · · · ·
WELL LOG			SKETCH SHOWI		
Formation Saud + 9tavel	From	То		N.	
bl. clay		50			
br. shale	ļ	75		•	•
Sand		97			_
Lime		113	₩.		Ξ.
a version and a statement of the reference administration of the same of the s				s.	



42	ļ

52484

CONSTRUCTION DETAI	LS	BAILING OR PUMPING TEST			
Casing diameter 6 Length	of casi	ng <u>7</u> 2	Pumping rate		G.P.M.
Type of screen Length	of scre	en	Duration of test 34 hrs.		
Type of pomp			Drawdown ft.	Date 7-1	2-50
Capacity of pump			Developed capacity_	\$ TABLE 1 TO 1 TO 1 TO 1 TO 1 TO 1 TO 1 TO 1 T	
Depth of pump setting	Depth of pump setting St			to water	ft.
Date of completion_			Pump installed by		
WELL LOG		1	SKETCH SHOW	ING LOCATION	
Formation	From	To		n.	
yel clay	0	20			
bl. clay		50			
gravel + bl. clay	1	60			
sand + gravel	•	72			_
ks.		101	w.		Z.
water as'					
	:	1			
	-			s.	
Drilling Firm Flave	lan		Date	3-1-60	
Address	\		Copied by	es	

, smokey ld.

WF'L LOG AND DRILLING REPORT

43,52 40

86402

ORIGINAL

State of Ohio DEPARTMENT OF NATURAL RESOURCES Division of Water Columbus, Ohio

Asaut Section of Township Township...

CONSTRUCTION	DETAILS		PUMPING TEST		
Casing diameter 5 Length of casing 72 Type of screen Length of screen. Type of pump Capacity of pump cpth of pump setting			Developed capacity Static level—depth to water ft.		
WELL LO			SKETCH SHOWING LOCATION		
Formations Sandstone, shale, limestone, gravel and clay	From	То	Locate in reference to numbered State Highways, St. Intersections, County roads, etc.		
Blue clay Sand & gravel Lime stone	0 Feet 20 60 72	20 Ft. 60 72 91	NON-RESPONSIVE		
water at	90ft		W. E.		

Drilling Firm....

LOCATED

WELL LOG AND DRILLING REPORT

44

NO. <u>68992</u>

County Severa Township Place sout Section of Township 15

CONSTRUCTION DETAI	ILS		BAILING OR PUM	ING TEST		
Casing diameter 4/4 Length	of casi	ng_ <i>2</i> /6	Pumping rate_	G.P.M.		
Type of screen Length	of scre	en	Duration of test hrs.			
Type of pump	Pump Dr			. ,/		
Capacity of pump			Developed capacity			
Depth of pump setting			Static level - depth to	water 42 ft.		
Date of completion	-		Pump installed by			
WELL LOG			SKETCH SHOWING	LCCATION		
Pormation	From	To	n.			
top soil	0	12				
yel clay		10				
bl. clay	1	18				
quick saud		82	w.	Ξ.		
rock	1	702	**	2.		
	!					
			·			
			s.			
Drilling Pirm Foxte	st Jou	e-	Date	3-1-60 U.U.		
				RS LOCATED		

Appendix C1 Geotechnical Analysis Results for Interconnectedness Evaluation

PARTICLE SIZE ANALYSIS OF SOILS (ASTM D 422)

'roject Name:

ERM - Columbus

Sample ID:

GT-1

Work Order No.:

Lubrizol

Sample Source: Sample Depth:

NA 18.5'-21'

09928.00.01

150

Date Collected: 2/29/2000

Soil Description:

Clay

Classification:

Silty Clay (CL-ML)

Date Analyzed:

3/14/2000 - 3/16/2000

Performed By:

DJM/GAL/BTS

Location of Test:

ERM - Soils Lab

Checked By:

MAS

PRE SIEVE AND HYDROMETER TEST

NA

Mass of Total Sample (g): 365.8

365.2 Sample Passing #10 Sieve (g):

Sample Used for Hydrometer (g): 50.5 Mass of Sample Represented (g): 50.6

Specific Gravity:

2.70

SIEVE RETAINED (g) **FINER** 3/4" 100.0% 0.0 3/8 0.0 100.0% #4 0.2 99.9% **#**10 0.4 99.8% #40 NA NA

NA

0.99Correction factor a: 91-15601 Hydrometer ID: Dispersion Device: Apparatus A Dispersion Period: 1 minute 0.01344 Constant K:

		ELAPSED	TEMPERATURE		CORRECTED	P	D
DATE	TIME	TIME (min)	(°C)	READING	READING	(%)	(mm)
3/14	8:17	0.25	19.5	53	45	88.1	0.074
		0.5	19.5	51	43	84.2	0.054
	8:18	1	19.5	48	40	78.3	0.039
	8:19	2	19.5	43	35	68.5	0.029
	8:21	4	19.5	38	30	58.7	0.021
	8:25	8	19.5	32	24	47.0	0.016
	8:32	15	19.5	27	19	37.2	0.012
	8:47	30	19.5	25	17	33.3	0.009
	9:17	60	19.5	23	15	29.4	0.006
	10:17	120	20.0	20	12	23.5	0.004
	12:17	240	20.5	17	10	19.6	0.003
	16:17	480	21.0	15	8	15.7	0.002
3/15	8:17	1440	20.0	14	6	11.7	0.001
3/16	8:17	2880	18.0	14	6	11.7	0.001

POST HYDROMETER SIEVE

SIEVE	RETAINED (g)	CORRECTED (g)	FINER
#40	0.3	2.2	99.2%
#100	0.6	4.3	98.1%
#200	1.0	7.2	96.1%

NOTES:

- 1: Composite correction used to correct hydrometer readings to account for dispersing agent in the water, temperature changes, and reading at the top of the meniscus.
- 2: Portion used for hydrometer test was that passing the #10 sieve.

PARTICLE SIZE ANALYSIS OF SOILS (ASTM D 422)

Project Name:

ERM - Columbus

Sample ID:

GT-1

Lubrizol

Sample Source:

NA

Project Number: 09928.00.01

Sample Depth:

18.5'-21'

Date Collected:

2/29/2000

Soil Description: Clay

Classification:

Silty Clay (CL-ML)

Date Analyzed:

3/14/2000 - 3/16/2000

Performed By:

DJM/GAL/BTS

Location of Test: ERM - Soils Lab

Checked By:

MUB

GRAIN SIZE DATA

	GRAIN SIZE	% FINER
SIEVE	3/4"	100.0
}	3/8"	100.0
	#4 (4.75 mm)	99.9
	#10(2.00mm)	99.8
	#40(425um)	99.2
	#100(150um)	98.1
]	#200(75um)	96.1
HYDROMETER	74um	88.1
	4um	23.5
	lum	11.7_

0.1 % Gravel

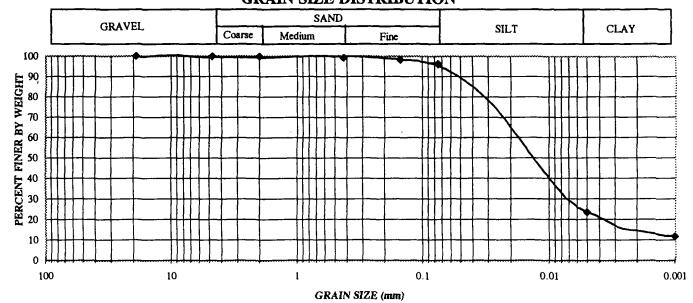
0.1 % Coarse Sand

0.6 % Medium Sand

3.1 % Fine Sand

96.1 % Fines

GRAIN SIZE DISTRIBUTION





Dell Engineering, Inc. A Member of the ERM Group

3352 128th Avenue Holland, MI 49424-9263 (616) 399-3500 (616) 399-3777 (tax)

TEST REPORT Atterberg Limits ASTM D 4318

PROJECT INFORMATION

Client: ERM - Columbus

Lab Project #:

00-03-02

Project: Lubrizol

W.O. #: 09928.00.01

Sample #:

GT-1 18.5'-21'

Sample Desc.:

Clay Shelby Tube

LIQUID LIMIT TEST RESULTS

Tin #:

13

14

17

19

Blows:

11

17

30

15

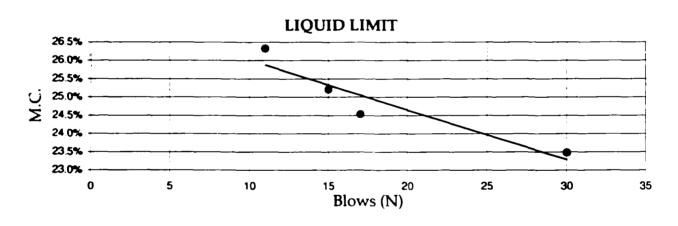
M.C.:

26.3%

24.5%

23.5%

25.2%



LIQUID LIMIT:

24

PLASTIC LIMIT TEST RESULTS

Tin #:

24

21

M.C.:

17.5%

16.7%

PLASTIC LIMIT:

17.1

PLASTICITY INDEX:

6.9

Checked: MJ/3

Printed 3/23/00



Dell Engineering, Inc. A Member of the ERM Group

3352 128th Avenue Holland, MI 49424-9263 (616) 399-3500 (616) 399-3777 (tax)

TEST REPORT Specific Gravity ASTM D 854

PROJECT INFORMATION

Client:

ERM - Columbus

Lab Project #:

00-03-02

Project:

Lubrizol Sample #: GT-1 18.5'-21'

W.O. #: 09928.00.01

Sample Desc.:

Clay Shelby Tube

PYNCNOMETER INFORMATION

Pyncnometer #:

3

Volume of Pynchometer:

500.0 ml

Dry Weight of Pyncnometer: 183.4 grams

TEST INFORMATION

Weight of Oven Dry Soil:

29.2 grams

Weight of Pyncnometer + Water + Soil: 699.9 grams

Temperature:

23.0 C

Weight of Pynchometer + Water: 681.5 grams

Specific Gravity at 20 C:

2.70

NOTES

1 Sample used for specific gravity test was representative of the entire sample.

2 Oven dry weight determined before test.

Checked: MJ13

Printed 3/23/00



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TEST REPORT

Hydraulic Conductivity ASTM D 5084

Flexible wall permeability using Mercury

PROJECT INFORMATION

Client:

ERM - Columbus

Project: Lubrizol

W.O. #: 09928.00.01

Lab Project #:

00-03-02

Sample #:

GT-1 18.5' to 21'

Sample Desc.:

Clay Shelby Tube

SAMPLE INFORMATION

_	Int	ial	<u>Fir</u>	<u>al</u>
Length:	7.15 cm	2.81 in	7.08 cm	2.79 in
Diameter:	7.15 cm	2.81 in	7.15 c m	2.81 in
Water Content:	26%		26%	
Dry Density:	1.59 g/cc	98.9 pcf	1.59 g/cc	99.4 pcf
Saturation:	99%		101%	

PERMOMETER TEST

Permeant Liquid: .005 CaSO4

Hydraulic gradient:

7.0

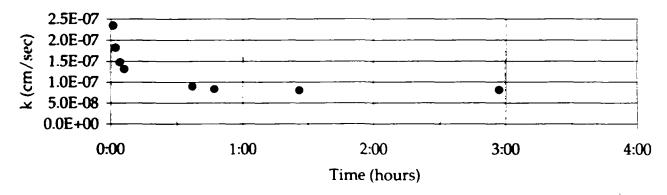
to

41.4

Back Pressure: 45 psi

Effective Consolidation: 5 psi

Hydraulic Conductivity VS Time



Average Stabilized Hydraulic Conductivity k:

8.4E-08 cm/sec

Checked: Murs

Printed 4/10/00

PARTICLE SIZE ANALYSIS OF SOILS (ASTM D 422)

?roject Name:

ERM - Columbus

Sample ID:

GT-1

Work Order No.:

Lubrizol

Sample Source:

NA

09928.00.01

Sample Depth: Date Collected: 28'-30' 2/29/2000

Soil Description:

Clay

Classification:

Lean Clay (CL)

Date Analyzed:

3/14/2000 - 3/16/2000

Performed By:

DJM/GAL/BTS

Location of Test:

SIEVE

3/4"

3/8"

#4

#10

#40

#50

ERM - Soils Lab

Checked By:

MICS

PRE SIEVE AND HYDROMETER TEST

Mass of Total Sample (g): 569.5

RETAINED (g)

 $0.\overline{0}$

11.4

9.9

8.8

NA

NA

Sample Passing #10 Sieve (g): 539.4

FINER

100.0%

98.0%

96.3%

94.7%

NA

ÑΑ

Sample Used for Hydrometer (g): 51.7

Mass of Sample Represented (g):

54.6

Specific Gravity:

2.65

Correction factor a:

1.00

Hydrometer ID: Dispersion Device: 89-20510 Apparatus A

Dispersion Period:

1 minute

Constant K:

0.01365

		ELAPSED	TEMPERATURE		CORRECTED	P	D
DATE	TIME	TIME (min)	(°C)	READING	READING	(%)	(mm
3/14	8:17	0.25	19.5	50	42	76.9	0.078
		0.5	19.5	49	41	75.1	0.055
	8:18	1	19.5	47	39	71.4	0.040
	8:19	2	19.5	45	37	67.7	0.029
	8:21	4	19.5	43	35	64.1	0.02
	8:25	8	19.5	42	34	62.2	0.015
	8:32	15	19.5	40	32	58.6	0.01
	8:47	30	19.5	36	28	51.3	0.00
	9:17	60	19.5	32	24	43.9	0.00
	10:17	120	20.0	29	21	38.4	0.00
	12:17	240	20.5	25	18	33.0	0.00
	16:17	480	21.0	22	15	27.5	0.002
3/15	8:17	1440	20.0	20	12	22.0	0.00
3/16	8:17	2880	18.0	19	11	20.1	0.00

POST HYDROMETER SIEVE

SIEVE	RETAINED (g)	CORRECTED (g)	FINER
#40	2.4	25.0	90.3%
#100	2.9	30.2	85.0%
#200	2.2	22.9	81.0%

NOTES:

- 1: Composite correction used to correct hydrometer readings to account for dispersing agent in the water, temperature changes, and reading at the top of the meniscus.
- 2: Portion used for hydrometer test was that passing the #10 sieve.

PARTICLE SIZE ANALYSIS OF SOILS (ASTM D 422)

Project Name: **ERM** - Columbus

GT-1 Sample ID:

Lubrizol

Sample Source: NA

Project Number: 09928.00.01

Sample Depth: 28'-30'

Date Collected: 2/29/2000

Soil Description: Clay

Classification: Lean Clay (CL)

3/14/2000 - 3/16/2000 Date Analyzed:

Performed By: DJM/GAL/BTS

Location of Test: ERM - Soils Lab

Checked By: MUS

GRAIN SIZE DATA

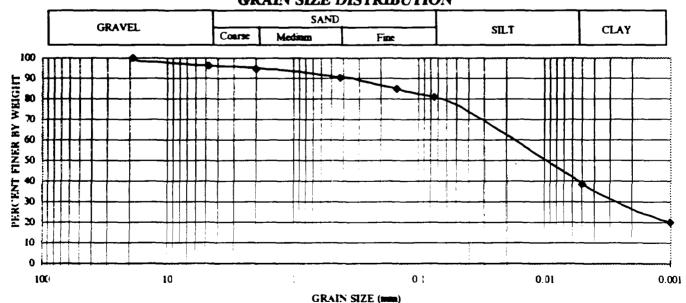
_		
ĺ	GRAIN SIZE	% FINER
SIEVE	3/4"	100.0
	3/8"	98.0
	#4 (4.75 mm)	96.3
	#10(2.00mm)	94.7
	#40(425um)	90.3
	#100(150um)	85.0
	#200(75um)	81.0
HYDROMETER	78um	76.9
	4um	38.4
	lum	20.1

3.7 % Gravel 1.6 % Coarse Sand 4.4 % Medium Sand

9.3 % Fine Sand

81.0 % Fines

GRAIN SIZE DISTRIBUTION





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TEST REPORT Atterberg Limits ASTM D 4318

PROJECT INFORMATION

Client:

ERM - Columbus

Lab Project #:

00-03-02

Project:

Lubrizol

Sample #:

GT-1 28'-30'

W.O. #: 09928.00.01

Sample Desc.:

Clay Shelby Tube

LIQUID LIMIT TEST RESULTS

Tin #:

21

22

23

Blows:

16

26

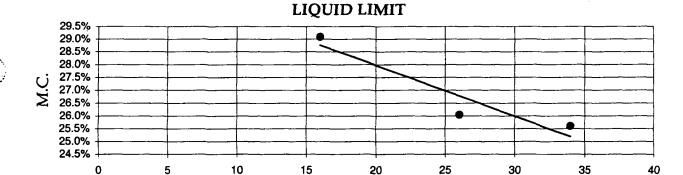
34

M.C.:

29.1%

26.0%

25.6%



Blows (N)

LIQUID LIMIT:

27

PLASTIC LIMIT TEST RESULTS

Tin #:

16

19

M.C.:

17.1%

16.7%

PLASTIC LIMIT:

16.9

PLASTICITY INDEX:

10.1

Checked: MJB

Printed 3/23/00



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TEST REPORT Specific Gravity ASTM D 854

PROJECT INFORMATION

Client: **ERM** - Columbus Lab Project #:

00-03-02

Project: Lubrizol

Sample #:

GT-1 28'-30'

W.O. #: 09928.00.01

Sample Desc.:

Clay Shelby Tube

PYNCNOMETER INFORMATION

Pyncnometer #:

Volume of Pvncnometer:

500.0 ml

Dry Weight of Pynchometer: 180.8 grams

TEST INFORMATION

Weight of Oven Dry Soil: 28.4 grams

Weight of Pynchometer + Water + Soil: 696.7 grams

24.0 C Temperature:

Weight of Pynchometer + Water: 679.0 grams

Specific Gravity at 20 C: 2.65

NOTES

1 Sample used for specific gravity test was representative of the entire sample.

2 Oven dry weight determined before test.

Checked: HJO

Printed 3/23/00



3352 128th Avenue Holland, MI 49424-9263 (616) 399-3500 (616) 399-3777 (tax)

TEST REPORT

Hydraulic Conductivity ASTM D 5084

Flexible wall permeability using Mercury

PROJECT INFORMATION

Client:

ERM - Columbus

Lab Project #:

00-03-02

Project:

Lubrizol

Sample #:

GT-1 28' to 30'

W.O. #:

09928.00.01

Sample Desc.:

Clay Shelby Tube

SAMPLE INFORMATION

	<u> Intial</u>		Final	
Length:	6.43 cm	2.53 in	6.37 cm	2.51 in
Diameter:	7.33 cm	2.89 in	7.33 cm	2.89 in
Water Content:	16%		16%	
Dry Density:	1.84 g/cc	114.7 pcf	1.86 g/cc	116.3 pcf
Saturation:	93%		100%	

PERMOMETER TEST

Permeant Liquid: .005 CaSO4

Back Pressure: 45 psi

Hydraulic gradient:

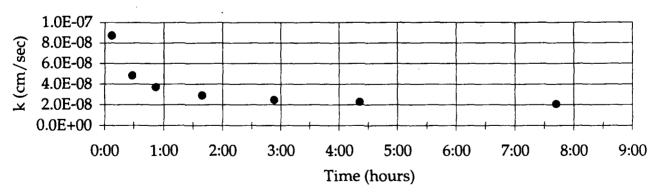
13.1

54.2

to

Effective Consolidation: 5 psi

Hydraulic Conductivity VS Time



Average Stabilized Hydraulic Conductivity k:

2.4E-08 cm/sec

Checked: MB

Printed 4/11/00

roject Name:

ERM - Columbus

Sample ID:

GT-2

Lubrizol

Sample Source:

NA

Work Order No.:

09928.00.01

Sample Depth:

16'-18.5'

Date Collected

2/29/2000

Soil Description: Classification:

Silt or Clay Silt (ML)

Date Analyzed:

3/14/2000 - 3'16'2000

Performed By:

DJM/GAL/BTS

Location of Test:

ERM - Soils Lab

Checked By:

MUB

PRE SIEVE AND HYDROMETER TEST

Mass of Total Sample (g): 634.0

Sample Passing #10 Sieve (g):

634.0

Sample Used for Hydrometer (g): 54.7

Mass of Sample Represented (g):

54.7

Specific Gravity:

2.74

Correction factor a:

0.98

Hvdrometer ID: Dispersion Device: 89-20510 Apparatus A

Dispersion Period: Constant K:

1 minute 0.01325

SIEVE	RETAINED (g)	FINER
3/4"	0.0	100.0%
3/8*	0.0	100.0%
#4	0.0	100.0%
#10	0.0	100.0%
#40	NA	NA
#50	NA	NA

i		ELAPSED	TEMPERATURE		CORRECTED	P	D
DATE	TIME	TIME (min)	(°C)	READING	READING	(%)	(mm)
3/14	8:28	0.25	19.5	51	43	77.0	0.075
		0.5	19.5	46	38	68.1	0.055
	8:29	1	19.5	42	34	60.9	0.041
	8:30	2	19.5	36	28	50.2	0.030
	8:32	4	19.5	32	24	43.0	0.022
	8:36	8	19.5	25	17	30.5	0.016
	8:43	15	19.5	22	14	25.1	0.012
	8:58	30	19.5	19	11	19.7	0.009
	9:28	60	19.5	18	10	17.9	0.006
	10:28	120	20.0	17	9	16.1	0.004
	12:28	240	20.5	15	8	14.3	0.003
	16:28	480	21.0	14	7	12.5	0.002
3/15	8:28	1440	20.0	13	5	9.0	100.0
3/16	8:28	2880	18.0	11	3	5.4	0.001

POST HYDROMETER SIEVE

SIEVE	RETAINED (g)	CORRECTED (g)	FINER
#40	0.0	0.0	100.0%
#100	0.2	2.3	99.6 %
W200	4.1	47.5	92.1%

NOTES:

- 1: Composite correction used to correct hydrometer readings to account for dispersing agent in the water, temperature changes, and reading at the top of the meniscus.
- 2: Portion used for hydrometer test was that passing the #10 sieve.

Project Name:

ERM - Columbus

Sample ID:

GT-2

Lubrizol

Sample Source: NA

Project Number: 09928.00.01

Sample Depth:

16'-18.5'

Date Collected: 2/29/2000

Soil Description: Silt or Clay

Classification:

Silt (ML)

Date Analyzed: 3/14/2000 - 3/16/2000

Performed By:

DJM/GAL/BTS

Location of Test: ERM - Soils Lab

Checked By:

MJB

GRAIN SIZE DATA

	GRAIN SIZE	% FINER
SIEVE	3/4"	100.0
	3/8"	100.0
	#4 (4.75 mm)	100.0
	#10(2.00mm)	100.0
	#40(425um)	100.0
	#100(150um)	99.6
	#200(75um)	92.1
HYDROMETER	75um	77.0
	4um	16.1
	lum	5.4

0.0 % Gravel

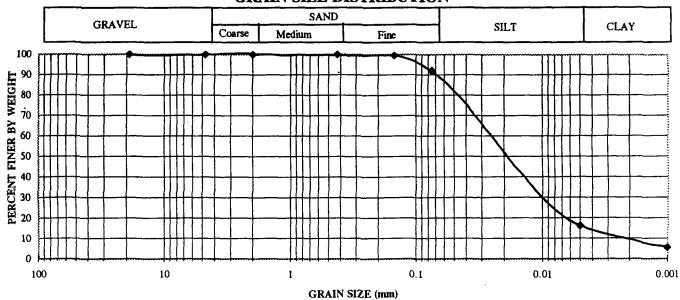
0.0 % Coarse Sand

0.0 % Medium Sand

7.9 % Fine Sand

92.1 % Fines

GRAIN SIZE DISTRIBUTION





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TEST REPORT Atterberg Limits ASTM D 4318

PROJECT INFORMATION

Client: **ERM** - Columbus

Lab Project #:

Sample #: GT-2 16'-18.5'

W.O. #: 09928.00.01

Project: Lubrizol

Sample Desc.:

Clay Shelby Tube

00-03-02

LIQUID LIMIT TEST RESULTS

Tin #:

14

13 15 16 9

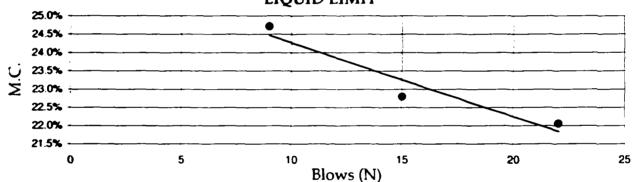
Blows: M.C.:

22 22.1%

22.8%

24.7%

LIQUID LIMIT



LIQUID LIMIT: 21

PLASTIC LIMIT TEST RESULTS

Tin #:

15

24

M.C.:

19.9%

19.1%

PLASTIC LIMIT:

19.5

PLASTICITY INDEX:

1.5

Checked:

Printed 3/23/00



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TEST REPORT Specific Gravity ASTM D 854

PROJECT INFORMATION

ERM - Columbus Client:

Project: Lubrizol

W.O. #: 09928.00.01

Lab Project #:

00-03-02

Sample #:

GT-2 16'-18.5'

Sample Desc.:

Clay Shelby Tube

PYNCNOMETER INFORMATION

Pyncnometer #:

5

Volume of Pynchometer:

500.0 ml

Dry Weight of Pynchometer: 166.0 grams

TEST INFORMATION

Weight of Oven Dry Soil: 32.9 grams

Weight of Pynchometer + Water + Soil: 685.0 grams

23.0 C Temperature:

Weight of Pynchometer + Water: 664.1 grams

Specific Gravity at 20 C: 2.74

NOTES

1 Sample used for specific gravity test was representative of the entire sample.

2 Oven dry weight determined before test.

Checked: MJr3

Printed 4/6/00



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TEST REPORT

Hydraulic Conductivity ASTM D 5084

Flexible wall permeability using Mercury

PROJECT INFORMATION

Client: ERM - Columbus Lab Project #: 00-03-02

Project: Lubrizol Sample #: GT-2 16' to 18.5'
W.O. #: 09928.00.01 Sample Desc.: Clay Shelby Tube

SAMPLE INFORMATION

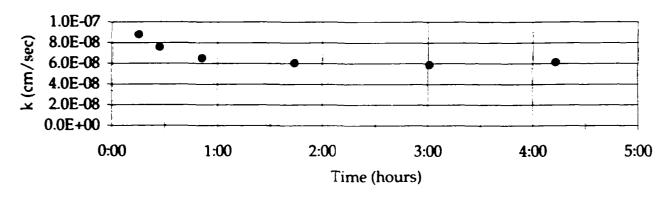
_	Intial		Final	
Length:	7.01 cm	2.76 in	7.02 cm	2.76 in
Diameter:	7.21 cm	2.84 in	7.27 cm	2.86 in
Water Content:	24%		26%	
Dry Density:	1.61 g/cc	100.6 pcf	1.57 g/cc	97.9 pcf
Saturation:	94%		96%	

... PERMOMETER TEST

Permeant Liquid: .005 CaSO4 Back Pressure: 45 psi

Hydraulic gradient: 7.2 to 50.5 Effective Consolidation: 5 psi

Hydraulic Conductivity VS Time



Average Stabilized Hydraulic Conductivity k: 6.1E-08 cm/sec

Checked: Printed 4/10/00

?roject Name:

ERM - Columbus

Sample ID:

GT-2

Lubrizol

Sample Source:

NA

Work Order No.:

09928.00.01

Sample Depth:

28'-30'

Date Collected:

2/29/2000

Soil Description:

SIEVE

3/4"

#40

#50

Silt or Clay

Classification:

Lean Clay (CL)

Date Analyzed:

3/14/2000 - 3/16/2000

Performed By:

DJM/GAL/BTS

Location of Test:

ERM - Soils Lab

Checked By:

MUB

PRE SIEVE AND HYDROMETER TEST

Mass of Total Sample (g): 573.9

Sample Passing #10 Sieve (g):

561.2

Sample Used for Hydrometer (g): 51.0

RETAINED (g) **FINER** Mass of Sample Represented (g):

52.2

Specific Gravity: 100.0% Correction factor a:

NA

NA

2.67 1.00

3/8" 0.0 100.0% 98.8% #4 6.7 97.8% #10 6.0

0.0

NA

NA

91-15601 Hydrometer ID: Dispersion Device: Apparatus A

Dispersion Period: Constant K:

1 minute 0.01365

		ELAPSED	TEMPERATURE		CORRECTED	P	D
DATE	TIME	TIME (min)	(°C)	READING	READING	(%)	(mm)
3/14	8:28	0.25	19.5	51	43	82.4	0.077
		0.5	19.5	50	42	80.5	0.055
	8:29	1	19.5	50	42	80.5	0.039
	8:30	2	19.5	49	41	78.6	0.028
	8:32	4	19.5	49	41	78.6	0.020
	8:36	8	19.5	48	40	76.7	0.014
	8:43	15	19.5	47	39	74.8	0.010
	8:58	30	19.5	44	36	69.0	0.008
	9:28	60	19.5	40	32	61.4	0.005
	10:28	120	20.0	35	27	51.8	0.004
	12:28	240	20.5	30	23	44.1	0.003
	16:28	480	21.0	27	20	38.3	0.002
3/15	8:28	1440	20.0	23	15	28.8	0.001
3/16	8:28	2880	18.0	21	13	24.9	0.001

POST HYDROMETER SIEVE

SIEVE	RETAINED (g)	CORRECTED (g)	FINER
#40	1.5	16.5	94.9%
#100	2.0	22.0	91.1%
#200	1.1	12.1	89.0%

NOTES:

- 1: Composite correction used to correct hydrometer readings to account for dispersing agent in the water, temperature changes, and reading at the top of the meniscus.
- 2: Portion used for hydrometer test was that passing the #10 sieve.

Project Name: ERM - Columbus Sample ID:

Lubrizol Sample Source: NA

Project Number: 09928.00.01 Sample Depth: 28'-30'

Date Collected: 2/29/2000

GT-2

Soil Description: Silt or Clay Classification: Lean Clay (CL)

Date Analyzed: 3/14/2000 - 3/16/2000 Performed By: DJM/GAL/BTS

Location of Test: ERM - Soils Lab Checked By:

GRAIN SIZE DATA

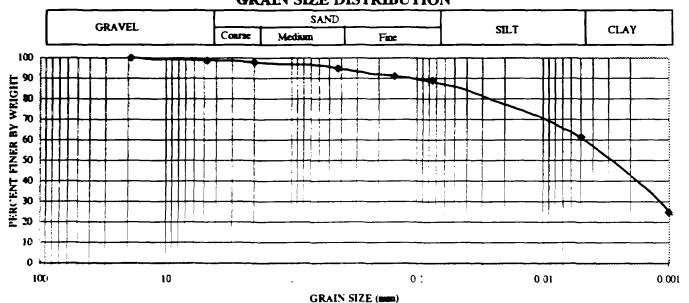
	GRAIN SIZE	% FINER
SIEVE	3/4"	100.0
	3/8*	100.0
1	#4 (4.75 mm)	98.8
	#10(2.00mm)	97.8
	#40(425um)	94.9
	#100(150um)	91.1
	#200(75um)	89.0
HYDROMETER	77um	82.4
1	5um	61.4
<u>[</u>	lum	24.9

1.2 % Gravel1.0 % Coarse Sand2.9 % Medium Sand

5.9 % Fine Sand

89.0 % Fines

GRAIN SIZE DISTRIBUTION





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TEST REPORT Atterberg Limits ASTM D 4318

PROJECT INFORMATION

Client:

ERM - Columbus

Lab Project #:

00-03-02

Project:

Lubrizol

Sample #:

GT-2 28'-30'

W.O. #: 09928.00.01

Sample Desc.:

Clay Shelby Tube

LIQUID LIMIT TEST RESULTS

Tin #:

15

16

20

Blows:

35

27

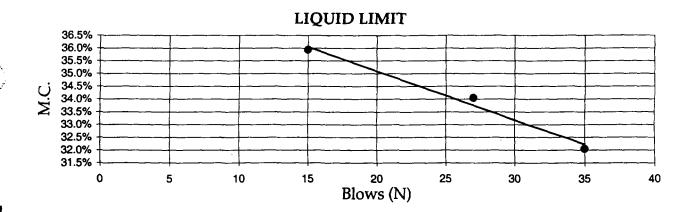
15

M.C.:

32.0%

34.0%

35.9%



LIQUID LIMIT:

34

PLASTIC LIMIT TEST RESULTS

Tin #:

23

22

M.C.:

20.0%

20.0%

PLASTIC LIMIT:

20.0

PLASTICITY INDEX:

14.0

Checked: HJB

Printed 3/23/00



3352 128th Avenue Holland, MI 49424-9263 (616) 399-3500 (616) 399-3777 (tax)

TEST REPORT Specific Gravity ASTM D 854

PROJECT INFORMATION

Client: ERM - Columbus Lab Project #: 00-03-02
Project: Lubrizol Sample #: GT-2 28'-30'

W.O. #: 09928.00.01 Sample Desc.: Clay Shelby Tube

PYNCNOMETER INFORMATION

Pyncnometer #: 4

Volume of Pynchometer: 500.0 ml Dry Weight of Pynchometer: 178.6 grams

TEST INFORMATION

Weight of Oven Dry Soil: 28.6 grams

Weight of Pynchometer + Water + Soil: 694.9 grams

Temperature: 22.0 C

Weight of Pynchometer + Water: 677.0 grams

Specific Gravity at 20 C: 2.67

NOTES

1 Sample used for specific gravity test was representative of the entire sample.

2 Oven dry weight determined before test.

Checked: HFB Printed 3/23/00



3352 128th Avenue Holland, MI 49424-9263 (616) 399-3500 (616) 399-3777 (tax)

TEST REPORT

Hydraulic Conductivity ASTM D 5084

Flexible wall permeability using Mercury

PROJECT INFORMATION

Client: Project:

ERM - Columbus

Lubrizol

W.O. #: 09928.00.01

Lab Project #:

00-03-02

Sample #:

GT-2 28' to 30'

Sample Desc.:

Clay Shelby Tube

SAMPLE INFORMATION

	Intial		Final	
Length:	7.03 cm	2.77 in	7.13 cm	2.81 in
Diameter:	7.30 cm	2.87 in	7.35 cm	2.89 in
Water Content:	29%		29%	
Dry Density:	1.53 g/cc	95.6 pcf	1.50 g/cc	93.7 pcf
Saturation:	105%		99%	

PERMOMETER TEST

Hydraulic gradient:

Permeant Liquid: .005 CaSO4

.000 Cabo4

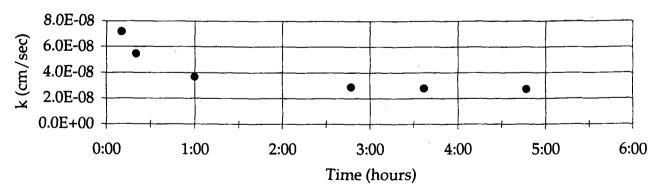
17.8 to

51.8

Back Pressure: 45 psi

Effective Consolidation: 5 psi

Hydraulic Conductivity VS Time



Average Stabilized Hydraulic Conductivity k:

3.0E-08 cm/sec

Checked: MITS

Printed 4/10/00

Project Name: ERM - Columbus Sample ID:

Lubrizol Sample Source: NA

Work Order No.: 09928.00.01 Sample Depth: 19'-21.5'

Date Collected: 3/1/2000

GT-3

Soil Description: Clay

Classification: Lean Clay (CL)

Date Analyzed: 3/15/2000 - 3/17/2000 Performed By: DJM Location of Test: ERM - Soils Lab Checked By: MJ/3

PRE SIEVE AND HYDROMETER TEST

Mass of Total Sample (g): 920.7 Sample Passing #10 Sieve (g): 920.7

Sample Used for Hydrometer (g): 52.3

Mass of Sample Represented (g): 52.3 SIEVE RETAINED (g) FINER 100.0% Specific Gravity: 2.65 3/4* 0.0 Correction factor a: 1.00 3/8" 0.0 100.0% Hydrometer ID: 91-15601 100.0% 14 0.0 Dispersion Device: **#**10 0.0 100.0% 140 Dispersion Period: NA NA

#10 0.0 100.0% Dispersion Device: Apparatus A
#40 NA NA Dispersion Period: 1 minute
#50 NA NA Constant K: 0.01365

| ELAPSED | TEMPERATURE | | CORRECTED | P

DATE	TIME	ELAPSED TIME (min)	TEMPERATURE (°C)	READING	CORRECTED READING	P (%)	D (mm)
3/15	8:10	0.25	20.0	55	47	89.9	0.074
		0.5	20.0	52	44	84.1	0.054
	8:11	1	20.0	50	42	80.3	0.039
	8:12	2	20.0	48	40	76.5	0.028
	8:14	4	20.0	46	38	72.7	0.020
	8:18	8	20.0	43	35	66.9	0.015
	8:25	15	20.0	40	32	61.2	0.011
	8:40	30	20.0	38	30	57.4	0.008
	9:10	60	20.0	34	26	49.7	0.006
	10:10	120	20.0	30	22	42.1	0.004
-	12:10	240	20.5	27	20	38.2	0.003
	16:10	480	21.0	24	17	32.5	0.002
3/16	8:10	1440	18.0	22	14	26.8	0.001
3/17	8:10	2880	19.0	21	13	24.9	0.001

POST HYDROMETER SIEVE

SIEVE	RETAINED (g)	CORRECTED (g)	FINER
# 40	0.1	1.8	99.8%
#100	0.1	1.8	99.6%
#200	0.2	3.5	99.2%

NOTES:

- 1: Composite correction used to correct hydrometer readings to account for dispersing agent in the water, temperature changes, and reading at the top of the meniscus.
- 2: Portion used for hydrometer test was that passing the #10 sieve.

Project Name:

ERM - Columbus

Sample ID:

GT-3

Lubrizol

Sample Source:

NA

Project Number: 09928.00.01

Sample Depth:

19'-21.5'

Date Collected:

3/1/2000

Soil Description: Clay

Classification:

Lean Clay (CL)

Date Analyzed: 3/15/2000 - 3/17/2000

Performed By:

DJM

Location of Test: ERM - Soils Lab

Checked By:

MUS

GRAIN SIZE DATA

GRAIN SIZE	% FINER
3/4"	100.0
3/8"	100.0
#4 (4.75 mm)	100.0
#10(2.00mm)	100.0
#40(425um)	99.8
#100(150um)	99.6
#200(75um)	99.2
74um	89.9
4um	42.1
lum	24.9
	3/4" 3/8" #4 (4.75 mm) #10(2.00mm) #40(425um) #100(150um) #200(75um) 74um 4um

0.0 % Gravel

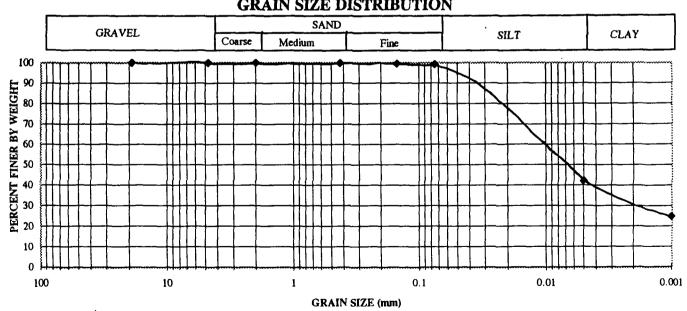
0.0 % Coarse Sand

0.2 % Medium Sand

0.6 % Fine Sand

99.2 % Fines

GRAIN SIZE DISTRIBUTION





3352 128th Avenue Holland, MI 49424-9263 (616) 399-3500 (616) 399-3777 (tax)

TEST REPORT Atterberg Limits ASTM D 4318

PROJECT INFORMATION

Client: **ERM** - Columbus

Lab Project #: Sample #: Project: Lubrizol

GT-3 19'-21.5'

00-03-02

W.O. #: 09928.00.01

Clay Shelby Tube Sample Desc.:

LIQUID LIMIT TEST RESULTS

Tin #: 20 17 **Blows**:

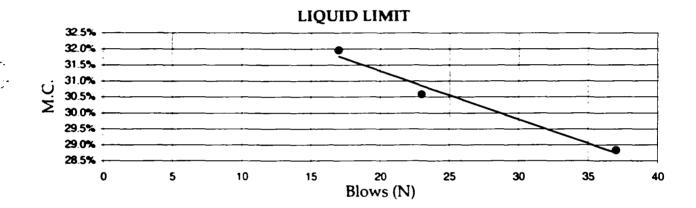
18 23 17 37

M.C.:

32.0%

30.6%

28.8%



LIQUID LIMIT: 30.5

PLASTIC LIMIT TEST RESULTS

Tin #: 24 15

M.C.: 18.5% 19.3%

PLASTIC LIMIT: 18.9 **PLASTICITY INDEX:** 11.6

Checked: H43

Printed 3/23/00



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A Member of the ERM Group

3352 128th Avenue Holland, MI 49424-9263 (616) 399-3500 (616) 399-3777 (tax)

TEST REPORT Specific Gravity ASTM D 854

PROJECT INFORMATION

Client:

ERM - Columbus

Lab Project #:

00-03-02

Project:

Lubrizol

Sample #:

GT-3 19'-21.5'

W.O. #: 09928.00.01

Sample Desc.:

Clay Shelby Tube

PYNCNOMETER INFORMATION

Pyncnometer #:

6

Volume of Pynchometer:

500.0 ml

Dry Weight of Pynchometer: 165.6 grams

TEST INFORMATION

Weight of Oven Dry Soil:

28.4 grams

Weight of Pynchometer + Water + Soil: 680.9 grams

Temperature:

25.0 C

Weight of Pynchometer + Water: 663.2 grams

Specific Gravity at 20 C:

2.65

NOTES

1 Sample used for specific gravity test was representative of the entire sample.

2 Oven dry weight determined before test.

Checked: MUB

Printed 3/23/00



3352 128th Avenue Holland, MI 49424-9263 (616: 399-3500 (616: 399-3777 (fax.)

TEST REPORT

Hydraulic Conductivity ASTM D 5084

Flexible wall permeability using Mercury

PROJECT INFORMATION

Client: ERM - Columbus

Project: Lubrizol W.O. #: 09928.00.01

Lab Project #:

00-03-02

Sample #:

GT-3 19' to 21.5'

Sample Desc.:

Clay Shelby Tube

SAMPLE INFORMATION

_	Intial		Final	
Length:	7.14 cm	2.81 in	7.14 cm	2.81 in
Diameter:	7.20 cm	2.83 in	7.16 cm	2.82 in
Water Content:	24%		22%	
Dry Density:	1.67 g/cc	104.4 pcf	1.72 g/cc	107.5 pcf
Saturation:	111%		110%	

PERMOMETER TEST

Permeant Liquid: .005 CaSO4

Hydraulic gradient:

6.7

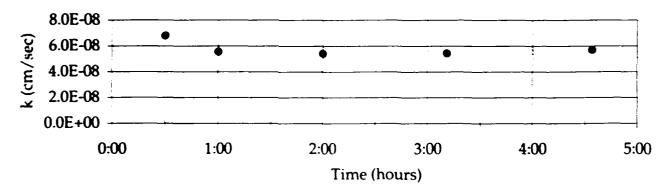
45.8

to

Back Pressure: 45 psi

Effective Consolidation: 5 psi

Hydraulic Conductivity VS Time



Average Stabilized Hydraulic Conductivity k:

5.5E-08 cm/sec

Checked: MIS

Printed 4/10/00

Project Name:

ERM - Columbus

Sample ID:

GT-3

Lubrizol

Sample Source:

NA

Work Order No.:

09928.00.01

Sample Depth:

28'-30'

Date Collected:

3/1/2000

Soil Description:

Clay

Classification:

Lean Clay (CL)

Date Analyzed:

3/16/2000 - 3/20/2000

Performed By:

DJM

Location of Test:

ERM - Soils Lab

Checked By:

MUS

PRE SIEVE AND HYDROMETER TEST

Mass of Total Sample (g): 925.2

Sample Passing #10 Sieve (g):

895.4

Sample Used for Hydrometer (g): 52.0

Mass of Sample Represented (g):

53.7

Specific Gravity:

2.57 1.02

Correction factor a: Hydrometer ID:

91-15601

Dispersion Device:

Apparatus A

Dispersion Period: Constant K:

1 minute 0.01408

SIEVE	RETAINED (g)	FINER
3/4"	0.0	100.0%
3/8"	2.1	99.8%
#4	9.3	98.8%
#10	18.4	96.8%
#40	NA	NA
#50	NA	NA

- 1 ⁷			ELAPSED	TEMPERATURE		CORRECTED	P	D
L	DATE	TIME	TIME (min)	(°C)	READING	READING	(%)	(mm)
	3/16	8:38	0.25	19.5	50	42	79.7	0.080
			0.5	19.5	48	40	75.9	0.058
		8:39	1	19.5	46	38	72.1	0.042
		8:40	2	19.5	44	36	68.3	0.030
		8:42	4	19.5	43	35	66.4	0.021
4		8:46	8	19.5	42	34	64.5	0.015
		8:53	15	19.5	40	32	60.7	0.011
		9:08	30	19.5	37	29	55.1	0.008
		9:38	60	19.5	33	25	47.5	0.006
		10:38	120	19.5	29	21	39.9	0.004
		12:38	240	19.5	25	17	32.3	0.003
		16:38	480	20.0	22	14	26.6	0.002
	3/17	8:38	1440	19.0	19	11	20.9	0.001
	3/18	8:38	2880	19.0	16	8	15.2	0.001

POST HYDROMETER SIEVE

	SIEVE	RETAINED (g)	CORRECTED (g)	FINER
	#40	3.6	62.0	90.1%
	#100	3.4	58.5	83.8%
I	#200	1.9	32.7	80.2%

NOTES:

- 1: Composite correction used to correct hydrometer readings to account for dispersing agent in the water, temperature changes, and reading at the top of the meniscus.
- 2: Portion used for hydrometer test was that passing the #10 sieve.

Project Name: ERM - Columbus Sample ID: GT-3

Lubrizol Sample Source: NA

Project Number: 09928.00.01 Sample Depth: 28'-30'

Date Collected: 3/1/2000

Soil Description: Clay

Classification: Lean Clay (CL)

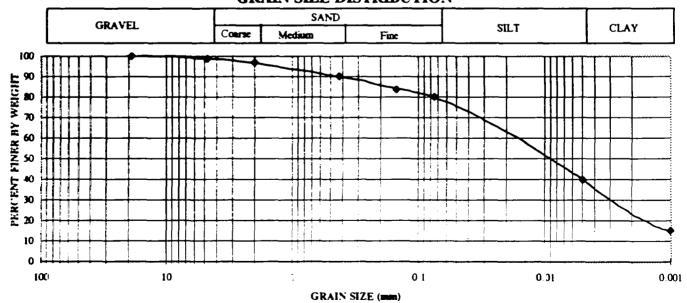
Date Analyzed: 3/16/2000 - 3/20/2000 Performed By: DJM Location of Test: ERM - Soils Lab Checked By:

GRAIN SIZE DATA

GRAIN SIZE	% FINER
3/4"	100.0
3/8*	99.8
#4 (4.75 mm)	98.8
#10(2.00mm)	96.8
#40(425um)	90.1
#100(150um)	83.8
#200(75um)	80.2
80um	79.7
4um	39.9
lum	15.2
	3/4" 3/8" #4 (4.75 mm) #10(2.00mm) #40(425um) #100(150um) #200(75um) 80um 4um

1.2 % Gravel
2.0 % Coarse Sand
6.7 % Medium Sand
9.9 % Fine Sand
80.2 % Fines

GRAIN SIZE DISTRIBUTION





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TEST REPORT Atterberg Limits ASTM D 4318

PROJECT INFORMATION

Client:

ERM - Columbus

Lab Project #:

00-03-02

Project: Lubrizol

Sample #:

GT-3 28'-30'

W.O. #: 09928.00.01

Sample Desc.:

Clay Shelby Tube

LIQUID LIMIT TEST RESULTS

Tin #:

21

22

23

Blows:

29

21

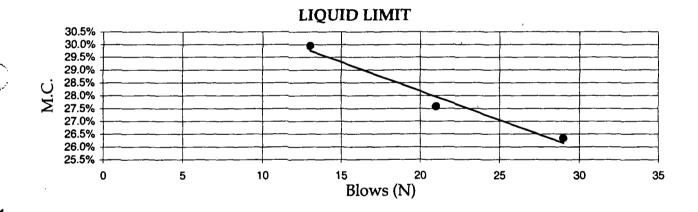
13

M.C.:

26.3%

27.6%

30.0%



LIQUID LIMIT:

27

PLASTIC LIMIT TEST RESULTS

Tin #:

16

20

M.C.:

17.6%

17.8%

PLASTIC LIMIT:

17.7

PLASTICITY INDEX:

9.3

MIB Checked:

Printed 3/23/00



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TEST REPORT Specific Gravity ASTM D 854

PROJECT INFORMATION

Client: ERM - Columbus Lab Project #: 00-03-02
Project: Lubrizol Sample #: GT-3 28'-30'

W.O. #: 09928.00.01 Sample Desc.: Clay Shelby Tube

PYNCNOMETER INFORMATION

Pvncnometer #:

Volume of Pynchometer: 500.0 ml

Dry Weight of Pynchometer: 178.7 grams

TEST INFORMATION

Weight of Oven Drv Soil: 29.8 grams

Weight of Pynchometer + Water + Soil: 695.2 grams

Temperature: 22.0 C

Weight of Pynchometer + Water: 677.0 grams

Specific Gravity at 20 C: 2.57

NOTES

1 Sample used for specific gravity test was representative of the entire sample.

2 Oven dry weight determined before test.

Checked: Mars

Printed 4/21/00



Dell Engineering, Inc.

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3352 128th Avenue Holland, MI 49424-9263 (616) 399-3500 (616) 399-3777 (tax)

TEST REPORT

Hydraulic Conductivity ASTM D 5084

Flexible wall permeability using Mercury

PROJECT INFORMATION

Client:

ERM - Columbus

Lab Project #:

00-03-02

Project:

Lubrizol

Sample #:

GT-3 28' - 30'

W.O. #: 09928.00.01

Sample Desc.:

Clay Shelby Tube

SAMPLE INFORMATION

	Int	ial	Final		
Length:	8.06 cm	3.17 in	8.05 cm	3.17 in	
Diameter:	7.25 cm	2.85 in	7.24 cm	2.85 in	
Water Content:	20%		21%		
Dry Density:	1.77 g/cc	110.3 pcf	1.76 g/cc	109.7 pcf	
Saturation:	112%		115%		

PERMOMETER TEST

Permeant Liquid: .005 CaSO4

Back Pressure: 45 psi

Hydraulic gradient:

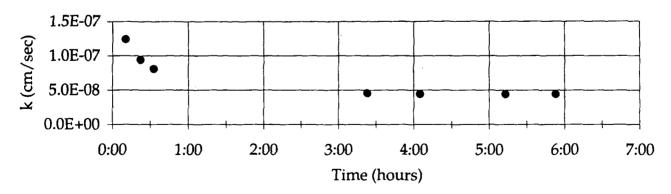
7.7

44.8

to

Effective Consolidation: 5 psi

Hydraulic Conductivity VS Time



Average Stabilized Hydraulic Conductivity k:

4.4E-08 cm/sec

Checked: MUB

Printed 4/10/00

'roject Name:

Work Order No.:

ERM - Columbus

Sample ID: GT-4

Lubrizol

Sample Source: NA

09928.00.01

Sample Depth: Date Collected:

16'-18.5' 3/1/2000

Soil Description:

Clay

Classification:

Lean Clay (CL)

Date Analyzed:

3/20/2000 - 3'23/2000

Performed By:

DJM

Location of Test:

ERM - Soils Lab

Checked By: MUS

PRE SIEVE AND HYDROMETER TEST

Mass of Total Sample (g): 601.0

Sample Passing #10 Sieve (g): 601.0

Sample Used for Hydrometer (g): 53.0

1	SIEVE	RETAINED (g)	FINER	Mass of Sample Represented (g):	53.0
ı	3/4*	0.0	100.0%	Specific Gravity:	2.69
ı	3/8"	0.0	100.0%	Correction factor a:	0.99
	14	0.0	100.0%	Hydrometer ID:	91-15601
	/ 10	0.0	100.0%	Dispersion Device:	Apparatus A
ı	# 40	NA	NA	Dispersion Period:	1 minute
ı	₽ 50	NA	NA	Constant K:	0.01344
•		.			
Ŧ		CI ADCCD	TEMPED ATURE	CODDECTED	T D T

4		ELAPSED	TEMPERATURE		CORRECTED	P	D
DATE	TIME	TIME (min)	(°C)	READING	READING	(%)	(mm)
3/21	8:39	0.25	20.0	57	49	91.5	0.071
		0.5	20.0	54	46	85.9	0.052
	8:40	1	20.0	52	44	82.2	0.037
	8:41	2	20.0	50	42	78.5	0.027
	8:43	4	20.0	49	41	76.6	0.019
	8:47	8	20.0	46	38	71.0	0.014
	8:54	15	20.0	43	35	65.4	0.011
	9:09	30	20.0	39	31	57.9	0.008
	9:39	60	20.0	34	26	48.6	0.006
	10:39	120	20.0	30	22	41.1	0.004
	12:39	240	21.0	27	20	37.4	0.003
	16:39	480	21.0	24	17	31.8	0.002
3/22	8:39	1440	19.5	21	13	24.3	0.001
3/23	8:39	2880	19.0	20	12	22.4	0.001

POST HYDROMETER SIEVE

SIEVE	RETAINED (g)	CORRECTED (g)	FINER
#40	0.0	0.0	100.0%
#100	0.2	2.3	99.6%
W200	0.3	3.4	99.1%

NOTES:

- 1: Composite correction used to correct hydrometer readings to account for dispersing agent in the water, temperature changes, and reading at the top of the meniscus.
- 2: Portion used for hydrometer test was that passing the #10 sieve.

Project Name:

ERM - Columbus

Sample ID:

GT-4

Lubrizol

Project Number: 09928.00.01

Sample Source:

NA

Sample Depth:

16'-18.5'

Date Collected:

3/1/2000

Soil Description: Clay

Classification:

Lean Clay (CL)

Date Analyzed: 3/20/2000 - 3/23/2000

Performed By:

DJM

Location of Test: ERM - Soils Lab

Checked By:

MJB

GRAIN SIZE DATA

	GRAIN SIZE	% FINER
SIEVE	3/4"	100.0
	3/8"	100.0
	#4 (4.75 mm)	100.0
	#10(2.00mm)	100.0
ł	#40(425um)	100.0
i	#100(150um)	99.6
	#200(75um)	99.1
HYDROMETER	71um	91.5
	4um	41.1
	lum	22.4

0.0 % Gravel

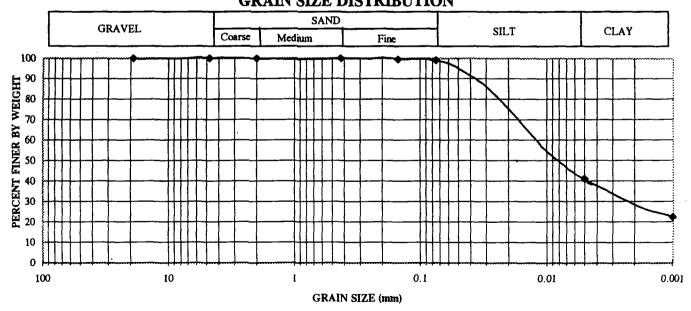
0.0 % Coarse Sand

0.0 % Medium Sand

0.9 % Fine Sand

99.1 % Fines

GRAIN SIZE DISTRIBUTION





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TEST REPORT Atterberg Limits ASTM D 4318

PROJECT INFORMATION

Client:

ERM - Columbus

Project: Lubrizol

W.O. #: 09928.00.01

Lab Project #:

00-03-02

Sample #:

GT-4 16'-18.5'

Sample Desc.:

Clay Shelby Tube

LIQUID LIMIT TEST RESULTS

Tin #:

24

19

13

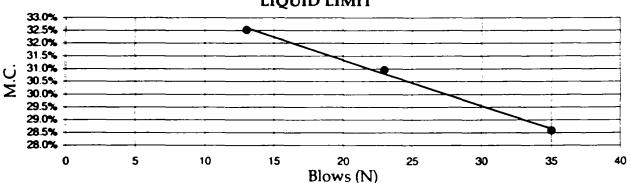
Blows: M.C.:

35 28.6%

23 31.0%

13 32.5%

LIQUID LIMIT



LIQUID LIMIT:

30

PLASTIC LIMIT TEST RESULTS

Tin #:

17

22

M.C.:

19.3%

19.3%

PLASTIC LIMIT:

19.3

PLASTICITY INDEX:

10.7

Checked: MIB

Printed 4/6/00



Project:

Dell Engineering , Inc. A Member of the ERM Group

3352 128th Avenue Holland, MI 49424-9263 (616) 399-3500 (616) 399-3777 (tax)

TEST REPORT Specific Gravity ASTM D 854

PROJECT INFORMATION

Client: **ERM** - Columbus

Lubrizol

W.O. #: 09928.00.01

Lab Project #:

00-03-02

Sample #:

GT-4 16'-18.5'

Sample Desc.:

Clay Shelby Tube

PYNCNOMETER INFORMATION

Pyncnometer #:

Volume of Pynchometer:

500.0 ml

Dry Weight of Pyncnometer: 178.7 grams

TEST INFORMATION

Weight of Oven Dry Soil: 26.6 grams

Weight of Pynchometer + Water + Soil: 693.9 grams

Temperature:

20.0 C

Weight of Pynchometer + Water: 677.2 grams

Specific Gravity at 20 C:

2.69

NOTES

1 Sample used for specific gravity test was representative of the entire sample.

2 Oven dry weight determined before test.

Checked: MJB

Printed 4/6/00



3352 128th Avenue Holland, MI 49424-9263 (616) 399-3500 (616) 399-3777 (tax)

TEST REPORT

Hydraulic Conductivity ASTM D 5084

Flexible wall permeability using Mercury

PROJECT INFORMATION

Client: ERM - Columbus

Project: Lubrizol

W.O. #: 09928.00.01

Lab Project #:

00-03-02

Sample #:

GT-4 16'-18.5'

Sample Desc.:

Clay Shelby Tube

SAMPLE INFORMATION

_	Intial		Final	
Length:	7.22 cm	2.84 in	6.53 cm	2.57 in
Diameter:	6.51 cm	2.56 in	7.30 cm	2.87 in
Water Content:	21%		24%	
Dry Density:	1.89 g/cc	118.2 pcf	1.63 g/cc	101.8 pcf
Saturation:	133%		99%	

PERMOMETER TEST

Permeant Liquid: .005 CaSO4

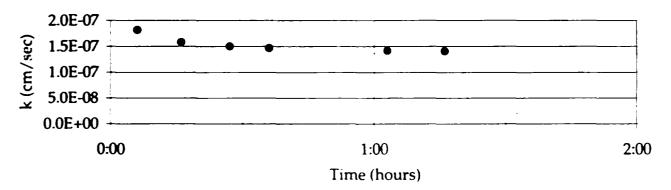
Hydraulic gradient: 15.8 to

49.2

Back Pressure: 45 psi

Effective Consolidation: 5 psi

Hydraulic Conductivity VS Time



Average Stabilized Hydraulic Conductivity k: 1.4E-07 cm/sec

Checked: MVB

Printed 4/10/00

roject Name:

ERM - Columbus

Sample ID:

GT-4

Work Order No.:

Lubrizol

Sample Source:

NA

09928.00.01

Sample Depth: Date Collected: 28'-30.5' 3/1/2000

Soil Description:

Clay

Classification:

Lean Clay (CL)

Date Analyzed:

3/21/2000 - 3/24/2000

Performed By:

DJM

Location of Test:

SIEVE

3/4"

3/8"

ERM - Soils Lab

Checked By:

MUB

PRE SIEVE AND HYDROMETER TEST

Mass of Total Sample (g): 477.3

Sample Passing #10 Sieve (g): 474.0

Sample Used for Hydrometer (g): 51.0

Mass of Sample Represented (g): 51.4

Specific Gravity: 2.72

0.99

100.0% Correction factor a: Hydrometer ID: 99.9%

FINER

100.0%

91-15601

#4 0.7 #10 1.6 99.5% #40 NA NA #50 NA NA

RETAINED (g)

 $0.\overline{0}$

0.0

Dispersion Device: Apparatus A Dispersion Period: 1 minute Constant K: 0.01344

DATE	TIME	ELAPSED TIME (min)	TEMPERATURE (°C)	READING	CORRECTED READING	P (%)	D (mm)
3/22	8:27	0.25	20.0	55	47	90.6	0.073
3,22	0.27	0.5	20.0	54	46	88.7	0.052
	8:28	1	20.0	53	45	86.7	0.037
	8:29	2	20.0	53	45	86.7	0.026
	8:31	4	20.0	53	45	86.7	0.019
an e	8:35	8	20.0	52	44	84.8	0.013
	8:42	15	20.0	51	43	82.9	0.010
	8:57	30	20.0	48	40	77.1	0.007
	9:27	60	20.0	45	37	71.3	0.005
	10:27	120	20.0	41	33	63.6	0.004
	12:27	240	20.0	37	29	55.9	0.003
	16:27	480	21.0	33	26	50.1	0.002
3/23	8:27	1440	19.0	28	20	38.6	0.001
3/24	8:27	2880	19.5	25	17	32.8	0.001

POST HYDROMETER SIEVE

SIEVE	RETAINED (g)	CORRECTED (g)	FINER
#40	1.0	9.3	97.6%
#100	1.4	13.0	94.8%
#200	0.9	8.4	93.1%

NOTES:

- 1: Composite correction used to correct hydrometer readings to account for dispersing agent in the water, temperature changes, and reading at the top of the meniscus.
- 2: Portion used for hydrometer test was that passing the #10 sieve.

Project Name:

ERM - Columbus

Sample ID:

GT-4

Lubrizol

Sample Source:

NA

Project Number: 09928.00.01

Sample Depth:

28'-30.5'

Date Collected:

3/1/2000

Soil Description: Clay

Classification:

Lean Clay (CL)

Date Analyzed:

3/21/2000 - 3/24/2000

Performed By:

DJM

Location of Test: ERM - Soils Lab

Checked By:

MUB

GRAIN SIZE DATA

	GRAIN SIZE	% FINER
SIEVE	3/4"	100.0
	3/8*	100.0
	#4 (4.75 mm)	99.9
	#10(2.00mm)	99.5
	#40(425um)	97.6
	#100(150um)	94.8
	#200(75um)	93.1
HYDROMETER	73 um	90.6
	Sum	71.3
	lum	32.8

0.1 % Gravel

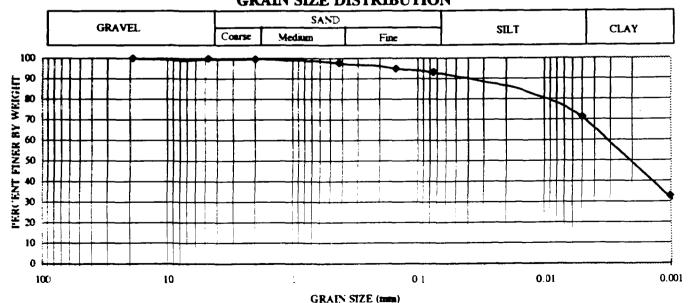
0.4 % Coarse Sand

1.9 % Medium Sand

4.5 % Fine Sand

93.1 % Fines

GRAIN SIZE DISTRIBUTION





3352 128th Avenue Holland, MI 49424-9263 (616) 399-3500 (616) 399-3777 (tax)

TEST REPORT Atterberg Limits ASTM D 4318

PROJECT INFORMATION

Client:

ERM - Columbus

Lab Project #:

00-03-02

Project: Lubrizol

W.O. #: 09928.00.01

Sample #:

GT-4 28'-30.5'

Sample Desc.:

Clay Shelby Tube

LIQUID LIMIT TEST RESULTS

Tin #:

23

16

20

Blows:

35

27

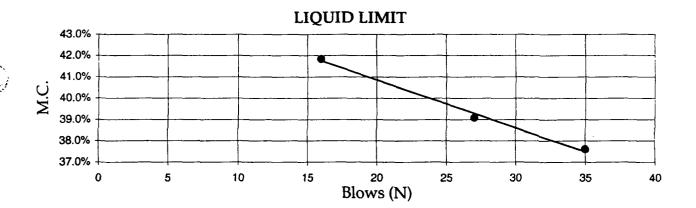
16

M.C.:

37.6%

39.1%

41.8%



LIQUID LIMIT:

40

PLASTIC LIMIT TEST RESULTS

Tin #:

14

21

M.C.:

22.4%

23.0%

PLASTIC LIMIT:

22.7

PLASTICITY INDEX:

17.3

Checked: MIG



3352 128th Avenue Holland, MI 49424-9263 (61o) 399-3500 (61o) 399-3777 (fax)

TEST REPORT Specific Gravity ASTM D 854

PROJECT INFORMATION

Client: ERM - Columbus Lab Project #: 00-03-02

Project: Lubrizol Sample #: GT-4 28'-30.5'

W.O. #: 09928.00.01 Sample Desc.: Clay Shelby Tube

PYNCNOMETER INFORMATION

Pyncnometer #: 7

Volume of Pynchometer: 500.0 ml Dry Weight of Pynchometer: 178.7 grams

TEST INFORMATION

Weight of Oven Dry Soil: 39.2 grams

Weight of Pynchometer + Water + Soil: 701.7 grams

Temperature: 23.0 C

Weight of Pynchometer + Water: 676.9 grams

Specific Gravity at 20 C: 2.72

NOTES

1 Sample used for specific gravity test was representative of the entire sample.

2 Oven dry weight determined before test.

Checked: MUS

Printed 4/6/00



Dell Engineering, Inc.

A Member of the ERM Group

3352 128th Avenue Holland, MI 49424-9263 (616) 399-3500 (616) 399-3777 (tax)

TEST REPORT

Hydraulic Conductivity ASTM D 5084

Flexible wall permeability using Mercury

PROJECT INFORMATION

Client: Project: **ERM** - Columbus

Lubrizol

W.O. #: 09928.00.01

Lab Project #:

00-03-02

Sample #:

GT-4 28'-30.5'

Sample Desc.:

Clay Shelby Tube

SAMPLE INFORMATION

	<u>Intial</u>		Final	
Length:	8.10 cm	3.19 in	8.12 cm	3.20 in
Diameter:	7.26 cm	2.86 in	7.29 cm	2.87 in
Water Content:	23%		26%	
Dry Density:	1.63 g/cc	101.9 pcf	1.58 g/cc	98.8 pcf
Saturation:	94%		100%	

PERMOMETER TEST

Hydraulic gradient:

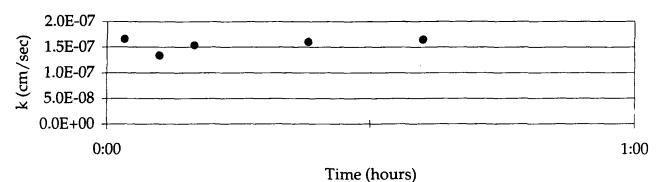
Permeant Liquid: .005 CaSO4

21.6 43.9 to

Back Pressure: 45 psi

Effective Consolidation: 5 psi

Hydraulic Conductivity VS Time



Average Stabilized Hydraulic Conductivity k:

1.5E-07 cm/sec

Checked: Mars

Printed 4/11/00

roject Name: ERM - Columbus Sample ID: GT-5

Lubrizol Sample Source: NA

Work Order No.: 09928.00.01 Sample Depth: 18'-20.5'

Date Collected: 3/1/2000

Soil Description: Clay

Classification: Lean Clay (CL)

#40

#50

Date Analyzed: 3/28/2000 - 3/31/2000 Performed By: GAL Location of Test: ERM - Soils Lab Checked By:

PRE SIEVE AND HYDROMETER TEST

Mass of Total Sample (g): 562.6 Sample Passing #10 Sieve (g): 560.1 Sample Used for Hydrometer (g): 50.7

Mass of Sample Represented (g): RETAINED (g) 50.9 SIEVE **FINER** Specific Gravity: 2.69 100.0% 3/4" 0.0 Correction factor a: 0.99 3/8° 0.0 100.0% Hvdrometer ID: 91-15601 0.8 99.9% #4 Dispersion Device: Apparatus A #10 1.7 99.6%

NA NA Dispersion Period: 1 minute
NA NA Constant K: 0.01344

		ELAPSED	TEMPERATURE		CORRECTED	P	D
DATE	TIME	TIME (min)	(°C)	READING	READING	(%)	(mm)
3/29	8:11	0.25	20.0	53	45	87.5	0.074
		0.5	20.0	51	43	83.6	0.054
	8:12	1	20.0	50	42	81.6	0.038
	8:13	2	20.0	48	40	77.8	0.028
	8:15	4	20.0	47	39	75.8	0.020
	8:19	8	20.0	45	37	71.9	0.014
	8:26	15	20.0	43	35	68.0	0.011
	8:41	30	20.0	40	32	62.2	0.008
	9:11	60	20.0	36	28	54.4	0.000
	10:11	120	20.0	33	25	48.6	0.004
	12:11	240	20.0	29	21	40.8	0.003
	16:11	480	20.0	25	17	33.0	0.002
3/30	8:11	1440	19.0	21	13	25.3	0.00
3/31	8:11	2880	18.5	20	12	23.3	0.001

POST HYDROMETER SIEVE

SIEVE	RETAINED (g)	CORRECTED (g)	FINER
#40	0.4	4.4	98.8%
#100	0.3	3.3	98.2%
#200	0.7	7.7	96.8%

NOTES:

- 1: Composite correction used to correct hydrometer readings to account for dispersing agent in the water, temperature changes, and reading at the top of the meniscus.
- 2: Portion used for hydrometer test was that passing the #10 sieve.

Project Name:

ERM - Columbus

Sample ID:

GT-5

Lubrizol

Sample Source:

NA

Project Number: 09928.00.01

Sample Depth:

18'-20.5'

Date Collected:

3/1/2000

Soil Description: Clay

Classification:

Lean Clay (CL)

Date Analyzed: 3/28/2000 - 3/31/2000

Performed By:

GAL

Location of Test: ERM - Soils Lab

Checked By:

MHS

GRAIN SIZE DATA

	GRAIN SIZE	% FINER
SIEVE	3/4"	100.0
	3/8"	100.0
	#4 (4.75 mm)	99.9
	#10(2.00mm)	99.6
	#40(425um)	98.8
	#100(150um)	98.2
	#200(75um)	96.8
HYDROMETER	74um	87.5
	4um	48.6
	lum	23.3

0.1 % Gravel

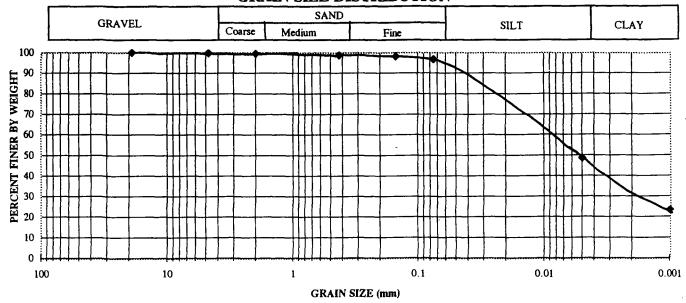
0.3 % Coarse Sand

0.8 % Medium Sand

2.0 % Fine Sand

96.8 % Fines

GRAIN SIZE DISTRIBUTION





3352 125th Avenue Holland, MI 49424-9263 (616) 399-3500 (616) 399-3777 (tax)

TEST REPORT Atterberg Limits ASTM D 4318

PROJECT INFORMATION

Client: ERM - Columbus

EKM - Columbus

W.O. #: 09928.00.01

Project: Lubrizol

Lab Project #: 00-03-02

Sample #:

GT-5 18'-20.5'

Sample Desc.:

Clay Shelby Tube

LIQUID LIMIT TEST RESULTS

Tin #:

13 24 14 18 21

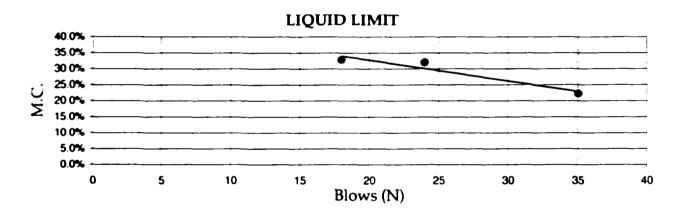
Blows:

35

M.C.: 32.0%

32.8%

22.3%



LIQUID LIMIT: 30

PLASTIC LIMIT TEST RESULTS

Tin #:

18

16

M.C.:

19.5%

20.1%

PLASTIC LIMIT:

19.8

PLASTICITY INDEX:

10.2

Checked: Hus

Printed 4/6/00



3352 128th Avenue Holland, MI 49424-9263 (616) 399-3500 (616) 399-3777 (tax)

TEST REPORT Specific Gravity ASTM D 854

PROJECT INFORMATION

Client: **ERM** - Columbus Lab Project #:

00-03-02

Project: Lubrizol

W.O. #: 09928.00.01

Sample #:

GT-5 18'-20.5'

Sample Desc.:

Clay Shelby Tube

PYNCNOMETER INFORMATION

Pyncnometer #:

Volume of Pynchometer:

500.0 ml

Dry Weight of Pyncnometer: 176.8 grams

TEST INFORMATION

Weight of Oven Dry Soil: 26.4 grams

Weight of Pynchometer + Water + Soil: 691.5 grams

25.0 C Temperature:

Weight of Pynchometer + Water: 674.9 grams

Specific Gravity at 20 C: 2.69

NOTES

1 Sample used for specific gravity test was representative of the entire sample.

2 Oven dry weight determined before test.

Checked: MUS

Printed 4/7/00



3352 128th Avenue Holland, MI 49424-9263 (616) 399-3500 (616) 399-3777 (fax)

TEST REPORT

Hydraulic Conductivity ASTM D 5084

Flexible wall permeability using Mercury

PROJECT INFORMATION

Client:

ERM - Columbus

Project: Lubrizol

W.O. #: 09928.00.01

Lab Project #:

00-03-02

Sample #:

GT-5 18'-20.5'

Sample Desc.:

Clay Shelby Tube

SAMPLE INFORMATION

_	<u>Int</u>	i <u>al</u>	<u> </u>	ıal
Length:	7.50 cm	2.95 in	7.50 cm	2.95 in
Diameter:	7.20 cm	2.83 in	7.20 cm	2.83 in
Water Content:	23%		24%	
Dry Density:	1.59 g/cc	99.5 pcf	1.59 g/cc	99.1 pcf
Saturation:	89%		92%	

PERMOMETER TEST

Permeant Liquid: .005 CaSO4

Hydraulic gradient:

12.2

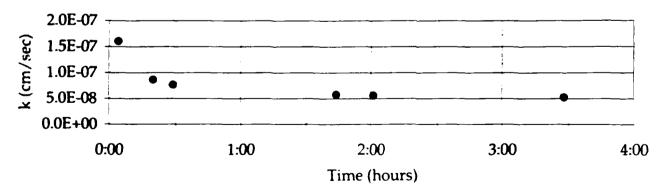
to

47.0

Back Pressure: 45 psi

Effective Consolidation: 5 psi

Hydraulic Conductivity VS Time



Average Stabilized Hydraulic Conductivity k:

6.0E-08 cm/sec

Checked: Mus

Printed 4/10/00

PARTICLE SIZE ANALYSIS OF SOILS (ASTM D 422)

Project Name:

ERM - Columbus

Sample ID:

GT-5

Lubrizol

SIEVE

3/4"

3/8"

#4

#10

#40

#50

Sample Source:

NA

Work Order No.:

09928.00.01

Sample Depth: Date Collected: 28'-30' 3/1/2000

Soil Description:

Clay

Classification:

Lean Clay (CL)

Date Analyzed:

3/29/2000 - 4/3/2000

Performed By:

GAL

Location of Test:

ERM - Soils Lab

Checked By:

MUB

PRE SIEVE AND HYDROMETER TEST

Mass of Total Sample (g): 567.5

RETAINED (g)

0.0

0.0

0.3

0.7

ÑΑ

NA

Sample Passing #10 Sieve (g):

566.5

FINER

100.0%

100.0%

99.9%

99.8%

NA

NA

Sample Used for Hydrometer (g): 52.1

Mass of Sample Represented (g):

52.2

Specific Gravity:

2.79

Correction factor a:

0.97

Hydrometer ID: Dispersion Device: 91-15601

Dispersion Period:

Apparatus A 1 minute

Constant K:

0.01323

1		ELAPSED	TEMPERATURE		CORRECTED	P	D
DATE	TIME	TIME (min)	(°C)	READING	READING	(%)	(mm)
3/30	8:14	0.25	19.0	56	48	89.2	0.071
		0.5	19.0	56	48	89.2	0.050
	8:15	1	19.0	55	47	87.4	0.036
	8:16	2	19.0	55	47	87.4	0.025
	8:18	4	19.0	54	46	85.5	0.018
	8:22	8	19.0	54	46	85.5	0.013
	8:29	15	19.0	51	43	79.9	0.010
	8:44	30	19.0	47	39	72.5	0.007
	9:14	60	19.0	43	35	65.0	0.005
	10:14	120	20.0	37	29	53.9	0.004
	12:14	240	20.0	33	25	46.5	0.003
	16:14	480	20.5	27	20	37.2	0.002
3/31	8:14	1440	18.5	23	·15	27.9	0.001
4/1	8:14	2880	20.5	19	12	22.3	0.001

POST HYDROMETER SIEVE

SIEVE	RETAINED (g)	CORRECTED (g)	FINER
#40	0.2	2.2	99.4%
#100	0.5	5.4	98.5%
#200	0.2	2.2	98.1%

NOTES:

- 1: Composite correction used to correct hydrometer readings to account for dispersing agent in the water, temperature changes, and reading at the top of the meniscus.
- 2: Portion used for hydrometer test was that passing the #10 sieve.

PARTICLE SIZE ANALYSIS OF SOILS (ASTM D 422)

Project Name:

ERM - Columbus

Sample ID:

GT-5

Lubrizol

Sample Source:

NA

Project Number: 09928.00.01

Sample Depth:

28'-30'

Date Collected:

3/1/2000

Soil Description: Clay

Classification:

Lean Clay (CL)

Date Analyzed: 3/29/2000 - 4/3/2000

Performed By:

GAL

Location of Test: ERM - Soils Lab

Checked By:

MUB

GRAIN SIZE DATA

f	GRAIN SIZE	% FINER
SIEVE	3/4"	100.0
	3/8"	100.0
	#4 (4.75 mm)	99.9
	#10(2.00mm)	99.8
Γ	#40(425um)	99.4
	#100(150um)	98.5
	#200(75um)	98.1
HYDROMETER	71um	89.2
	5um	65.0
	lum	22.3

0.1 % Gravel

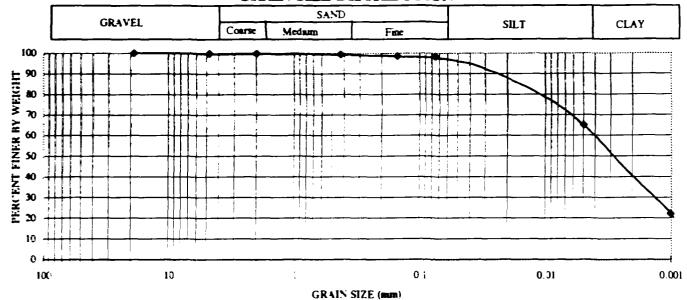
0.1 % Coarse Sand

0.4 % Medium Sand

1.3 % Fine Sand

98.1 % Fines

GRAIN SIZE DISTRIBUTION





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TEST REPORT Atterberg Limits ASTM D 4318

PROJECT INFORMATION

Client:

ERM - Columbus

Lab Project #:

00-03-02

Project:

Lubrizol

Sample #:

GT-5 28'-30'

W.O. #: 09928.00.01

Sample Desc.:

Clay Shelby Tube

LIQUID LIMIT TEST RESULTS

Tin #:

15

19

24

Blows:

32

28

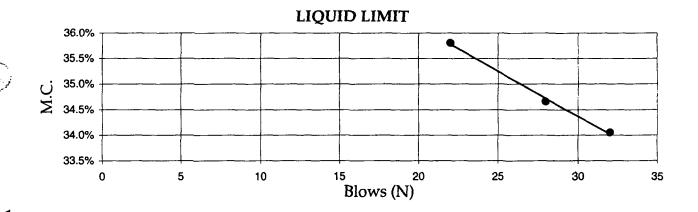
22

M.C.:

34.1%

34.7%

35.8%



LIQUID LIMIT:

35

PLASTIC LIMIT TEST RESULTS

Tin #:

22

23

M.C.:

22.1%

22.9%

PLASTIC LIMIT:

22.5

PLASTICITY INDEX:

12.5

Checked: MH3

Printed 4/6/00



3352 128th Avenue Holland, MI 49424-9263 (616) 399-3500 (616) 399-3777 (tax)

TEST REPORT Specific Gravity ASTM D 854

PROJECT INFORMATION

Client: ERM - Columbus Lab Project #: 00-03-02

Project: Lubrizol Sample #: GT-5 28'-30'

W.O. #: 09928.00.01 Sample Desc.: Clay Shelby Tube

PYNCNOMETER INFORMATION

Pyncnometer #: 1

Volume of Pynchometer: 500.0 ml

Dry Weight of Pynchometer: 178.7 grams

TEST INFORMATION

Weight of Oven Dry Soil: 31.8 grams

Weight of Pynchometer + Water + Soil: 697.6 grams

Temperature: 20.0 C

Weight of Pynchometer + Water: 677.2 grams

Specific Gravity at 20 C: 2.79

NOTES

1 Sample used for specific gravity test was representative of the entire sample.

2 Oven dry weight determined before test.

Checked: Mass

Printed 4/6/00



3352 128th Avenue Holland, MI 49424-9263 (616) 399-3500

(616) 399-3777 (tax)

TEST REPORT

Hydraulic Conductivity ASTM D 5084

Flexible wall permeability using Mercury

PROJECT INFORMATION

Client:

ERM - Columbus

Lubrizol

Project:

W.O. #: 09928.00.01

Lab Project #:

00-03-02

Sample #:

GT-5 28'-30'

Sample Desc.:

Clay Shelby Tube

SAMPLE INFORMATION

_	<u> </u>	<u>ial</u>	<u>Fir</u>	al
Length:	8.14 cm	3.20 in	8.18 cm	3.22 in
Diameter:	7.33 cm	2.89 in	7.30 cm	2.87 in
Water Content:	28%		27%	
Dry Density:	1.54 g/cc	96.0 pcf	1.56 g/cc	97.3 pcf
Saturation:	96%		97%	

PERMOMETER TEST

Permeant Liquid: .005 CaSO4

Hydraulic gradient:

to

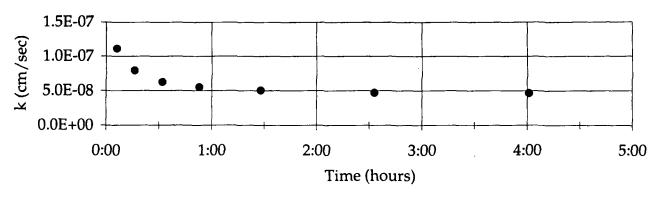
12.2

46.0

Back Pressure: 45 psi

Effective Consolidation: 5 psi

Hydraulic Conductivity VS Time



Average Stabilized Hydraulic Conductivity k:

5.0E-08 cm/sec

Checked: HIS

Printed 4/20/00

PARTICLE SIZE ANALYSIS OF SOILS (ASTM D 422)

2roject Name:

ERM - Columbus

Sample ID:

GT-6

Work Order No.:

i ubrizol

Sample Source:

NA

09928.00.01

Sample Depth: Date Collected: 16'-18.5' 3/1/2000

Soil Description:

Clay

Classification:

Silty Clay (CL-ML)

Date Analyzed:

3/29/2000 - 4/3/2000

Performed By:

GAL

Location of Test:

SIEVE

3/4"

3/8-

14

#10

#40

#50

ERM - Soils Lab

RETAINED (g)

0.0

NA

NA

Checked By:

NIB

PRE SIEVE AND HYDROMETER TEST

Mass of Total Sample (g): 448.8

Sample Passing #10 Sieve (g): Sample Used for Hydrometer (g): 53.9

448.8

Mass of Sample Represented (g):

53.9

Specific Gravity:

2.76

Correction factor a:

0.98

100.0% 0.0 Hydrometer ID: 0.0 100.0% 100.0% Dispersion Device: 0.0

FINER

100.0%

NA

NA

89-20510 Apparatus A

Dispersion Period: Constant K:

1 minute 0.01342

·		ELAPSED	TEMPERATURE	55.5016	CORRECTED	P	D
DATE	TIME	TIME (min)	(°C)	READING	READING	(%)	(mm)
3/30	8:14	0.25	19.0	58	50	90.9	0.070
		0.5	19.0	55	47	85.5	0.051
	8:15	1	19.0	51	43	78.2	0.038
	8:16	2	19.0	46	38	69.1	0.028
	8:18	4	19.0	41	33	60.0	0.021
	8:22	8	19.0	36	28	50.9	0.015
	8:29	15	19.0	32	24	43.6	0.012
	8:44	30	19.0	28	20	36.4	0.008
	9:14	60	19.0	24	16	29.1	0.006
	10:14	120	20.0	21	13	23.6	0.004
	12:14	240	20.0	19	11	20.0	0.003
	16:14	480	20.5	16	9	16.4	0.002
3/31	8:14	1440	18.5	14	6	10.9	0.001
4/]	8:14	2880	20.5	13	6	10.9	0.001

POST HYDROMETER SIEVE

SIEVE	RETAINED (g	CORRECTED (g)	FINER
#40	0.1	0.8	99.8%
#100	0.1	0.8	99.6%
#200	0.3	2.5	99.1%

_ NOTES:

- 1: Composite correction used to correct hydrometer readings to account for dispersing agent in the water, temperature changes, and reading at the top of the meniscus.
- 2: Portion used for hydrometer test was that passing the #10 sieve.

PARTICLE SIZE ANALYSIS OF SOILS (ASTM D 422)

Project Name: ERM - Columbus Sample ID:

GT-6

Lubrizol

Sample Source:

NA

Project Number: 09928.00.01

Sample Depth:

16'-18.5'

Date Collected:

3/1/2000

Soil Description: Clay

Classification:

Silty Clay (CL-ML)

Date Analyzed: 3/29/2000 - 4/3/2000

Performed By:

GAL

Location of Test: ERM - Soils Lab

Checked By:

MUS

GRAIN SIZE DATA

	GRAIN SIZE	% FINER
SIEVE	3/4"	100.0
	3/8"	100.0
Į.	#4 (4.75 mm)	100.0
i	#10(2.00mm)	100.0
[#40(425um)	99.8
	#100(150um)	99.6
	#200(75um)	99.1
HYDROMETER	70um	90.9
	4um	23.6
Į.	lum	10.9

0.0 % Gravel

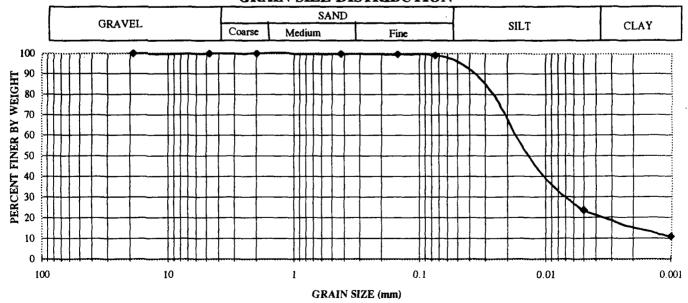
0.0 % Coarse Sand

0.2 % Medium Sand

0.7 % Fine Sand

99.1 % Fines

GRAIN SIZE DISTRIBUTION





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TEST REPORT Atterberg Limits ASTM D 4318

PROJECT INFORMATION

Client: ERM - Columbus

Lab Project #:

00-03-02

Project: Lubrizol

Sample #:

GT-6 16'-18.5'

W.O. #: 09928.00.01

Sample Desc.:

Clav Shelby Tube

LIQUID LIMIT TEST RESULTS

Tin #:

13

6

21

Blows:

32

22

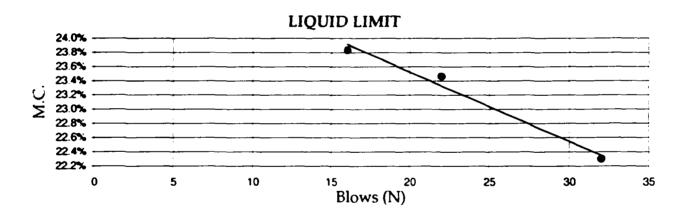
16

M.C.:

22.3%

23.5%

23.8%



LIQUID LIMIT:

23

PLASTIC LIMIT TEST RESULTS

Tin #:

16

18

M.C ·

17.6%

17.8%

PLASTIC LIMIT:

17.7

PLASTICITY INDEX:

5.3

Checked: MOD



3352 128th Avenue Holland, MI 49424-9263 (616) 399-3500 (616) 399-3777 (tax)

TEST REPORT Specific Gravity ASTM D 854

PROJECT INFORMATION

Client:

ERM - Columbus

Project:

Lubrizol

W.O. #:

09928.00.01

Lab Project #:

00-03-02

Sample #:

GT-6 16'-18.5'

Sample Desc.:

Clay Shelby Tube

PYNCNOMETER INFORMATION

Pyncnometer #:

2

Volume of Pynchometer:

500.0 ml

Dry Weight of Pynchometer: 180.8 grams

TEST INFORMATION

Weight of Oven Dry Soil:

24.0 grams

Weight of Pynchometer + Water + Soil: 694.8 grams

Temperature:

20.0 C

Weight of Pynchometer + Water: 679.5 grams

Specific Gravity at 20 C:

2.76

NOTES

- 1 Sample used for specific gravity test was representative of the entire sample.
- 2 Oven dry weight determined before test.

Checked: MdB

Printed 4/6/00



3352 128th Avenue Holland, MI 49424-9253 (616) 399-3500 (616) 399-3777 (tax)

TEST REPORT

Hydraulic Conductivity ASTM D 5084

Flexible wall permeability using Mercury

PROJECT INFORMATION

Client: ERM - Columbus

Project: Lubrizol

W.O. #: 09928.00.01

Lab Project #:

00-03-02

Sample #:

GT-6 16'-18.5'

Sample Desc.:

Clay Shelby Tube

SAMPLE INFORMATION

_	lnt	ial	Fir	nal
Length:	6.23 cm	2.45 in	6.20 cm	2.44 in
Diameter:	7.16 cm	2.82 in	7.07 cm	2.78 in
Water Content:	25%		24%	
Dry Density:	1.57 g/cc	98.0 pcf	1.62 g/cc	101.1 pcf
Saturation:	92%		94%	

PERMOMETER TEST

Permeant Liquid: .005 CaSO4

Hydraulic gradient:

8.3

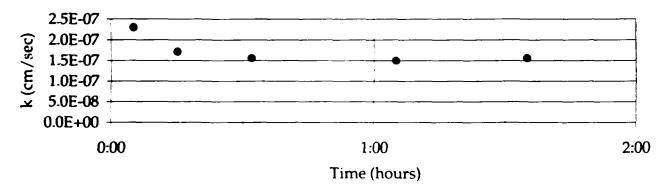
to

64.3

Back Pressure: 45 psi

Effective Consolidation: 5 psi

Hydraulic Conductivity VS Time



Average Stabilized Hydraulic Conductivity k:

1.6E-07 cm/sec

Checked: MUS

Printed 4/20/00

PARTICLE SIZE ANALYSIS OF SOILS (ASTM D 422)

Project Name:

ERM - Columbus

Sample ID:

GT-6

Lubrizol

Sample Source:

NA

Work Order No.:

09928.00.01

Sample Depth:

28'-30'

Date Collected:

3/1/2000

Soil Description:

Clay

Classification:

Lean Clay (CL)

Date Analyzed:

3/31/2000 - 4/7/2000

Performed By:

GAL

Location of Test:

SIEVE 3/4"

3/8"

#4

#10

#40

#50

ERM - Soils Lab

Checked By:

MAR

PRE SIEVE AND HYDROMETER TEST

Mass of Total Sample (g): 409.5

RETAINED (g)

8.0

4.4

7.0

13.9

NA

ÑΑ

Sample Passing #10 Sieve (g):

376.2

Sample Used for Hydrometer (g): 54.2

Mass of Sample Represented (g):

59.0

Specific Gravity:

2.83

Correction factor a:

0.96

Hydrometer ID:

89-20510

Dis

FINER

98.0%

97.0% 95.3%

91.9%

 $\overline{\mathsf{N}}\mathsf{A}$

ΝA

Dispersion Device:

Apparatus A 1 minute

Dispersion Period: Constant K:

0.01305

·)======= · Î		ELAPSED	TEMPERATURE		CORRECTED	P	D
DATE	TIME	TIME (min)	(°C)	READING	READING	(%)	(mm)
4/5	8:15	0.25	19.0	48	40	65.1	0.076
		0.5	19.0	45	37	60.2	0.055
	8:16	1	19.0	43	35	57.0	0.040
	8:17	2	19.0	42	34	55.3	0.028
	8:19	4	19.0	, 41	33	53.7	0.020
	8:23	. 8	19.0	39	31	50.4	0.015
	8:30	15	19.0	37	29	47.2	0.011
	8:45	30	19.0	34	26	42.3	0.008
	9:15	60	19.0	30	22	35.8	0.006
	10:15	120	20.0	27	19	30.9	0.004
	12:15	240	20.0	24	16	26.0	0.003
	16:15	480	20.5	21	14	22.8	0.002
4/6	8:15	1440	20.5	18	11	17.9	0.001
4/7	8:15	2880	20.0	16	8	13.0	0.001

POST HYDROMETER SIEVE

SIEVE	RETAINED (g)	CORRECTED (g)	FINER
#40	4.4	30.5	84.4%
#100	4.3	29.8	77.1%
#200	3.0	20.8	72.0%

NOTES:

- 1: Composite correction used to correct hydrometer readings to account for dispersing agent in the water, temperature changes, and reading at the top of the meniscus.
- 2: Portion used for hydrometer test was that passing the #10 sieve.

PARTICLE SIZE ANALYSIS OF SOILS (ASTM D 422)

ERM - Columbus Project Name:

Sample ID: Sample Source:

Lubrizol Project Number: 09928.00.01 NA

Sample Depth:

28'-30'

GT-6

Date Collected:

3/1/2000

Soil Description: Clay

Classification:

Lean Clay (CL)

Date Analyzed: 3/31/2000 - 4/7/2000

Performed By:

GAL

Location of Test: ERM - Soils Lab

Checked By:

MUS

GRAIN SIZE DATA

	GRAIN SIZE	% FINER
SIEVE	3/4"	98.0
	3/8"	97.0
	#4 (4.75 mm)	95.3
	#10(2.00mm)	91.9
	#40(425um)	84.4
	#100(150um)	77.1
	#200(75um)	72.0
HYDROMETER	76um	65.1
ł	4um	30.9
	lum	_ 13.0

4.7 % Gravel

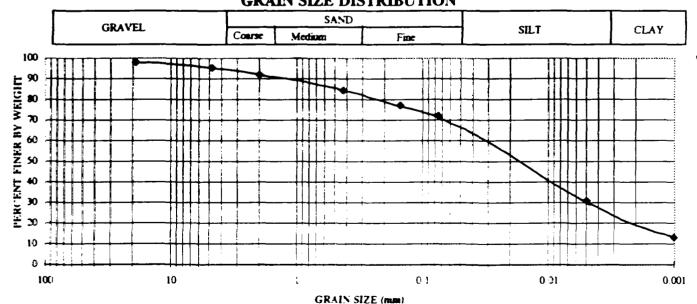
3.4 % Coarse Sand

7.5 % Medium Sand

12.4 % Fine Sand

72.0 % Fines

GRAIN SIZE DISTRIBUTION





3352 128th Avenue Holland, MI 49424-9263 (616) 399-3500 (616) 399-3777 (tax)

TEST REPORT Atterberg Limits ASTM D 4318

PROJECT INFORMATION

Client: Project:

ERM - Columbus

Lubrizol

W.O. #: 09928.00.01

Lab Project #:

00-03-02

Sample #:

GT-6 28'-30'

Sample Desc.:

Clay Shelby Tube

LIQUID LIMIT TEST RESULTS

Tin #:

15

21

22

Blows:

35

29

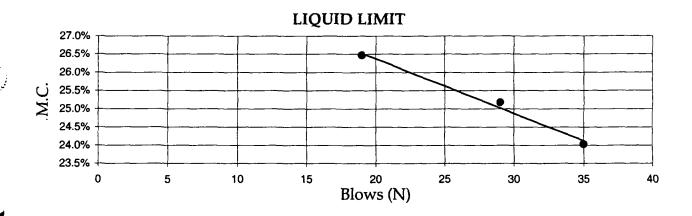
19

M.C.:

24.0%

25.2%

26.5%



LIQUID LIMIT:

25.5

PLASTIC LIMIT TEST RESULTS

Tin #:

23

24

M.C.:

16.3%

16.7%

PLASTIC LIMIT:

16.5

PLASTICITY INDEX:

9.0

Checked: Muss

Printed 4/7/00



3352 128th Avenue Holland, MI 49424-9263 616) 399-3500 #616) 399-3777 (tax)

TEST REPORT Specific Gravity ASTM D 854

PROJECT INFORMATION

Client: ERM - Columbus Lab Project #: 00-03-02
Project: Lubrizol Sample #: GT-6 28'-30'

W.O. #: 09928.00.01 Sample Desc.: Clay Shelby Tube

PYNCNOMETER INFORMATION

Pvncnometer #: 6

Volume of Pynchometer: 500.0 ml Dry Weight of Pynchometer: 165.6 grams

TEST INFORMATION

Weight of Oven Dry Soil: 23.2 grams

Weight of Pynchometer + Water + Soil: 678.9 grams

Temperature: 19.0 C

Weight of Pynchometer + Water: 663.9 grams

Specific Gravity at 20 C: 2.83

NOTES

1 Sample used for specific gravity test was representative of the entire sample.

2 Oven dry weight determined before test

Checked: MUS

Printed 4/6/00



Dell Engineering, Inc.

A Member of the ERM Group

3352 128th Avenue Holland, MI 49424-9263 (616) 399-3500 (616) 399-3777 (tax)

TEST REPORT

Hydraulic Conductivity ASTM D 5084

Flexible wall permeability using Mercury

PROJECT INFORMATION

Client:

ERM - Columbus

Lab Project #:

00-03-02

Project:

Lubrizol

Sample #:

GT-6 28'-30'

W.O. #: 09928.00.01

Sample Desc.:

Clay Shelby Tube

SAMPLE INFORMATION

_	Intial		Final	
Length:	7.35 cm	2.89 in	7.35 cm	2.89 in
Diameter:	7.30 cm	2.87 in	7.30 cm	2.87 in
Water Content:	21%		15%	
Dry Density:	1.83 g/cc	114.0 pcf	1.94 g/cc	121.0 pcf
Saturation:	109%		90%	

PERMOMETER TEST

Permeant Liquid: .005 CaSO4

Back Pressure: 45 psi

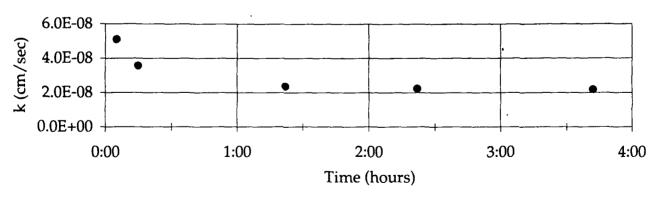
Hydraulic gradient:

27.8

53.4 to

Effective Consolidation: 5 psi

Hydraulic Conductivity VS Time



Average Stabilized Hydraulic Conductivity k:

2.6E-08 cm/sec

Checked: MJB

Printed 4/21/00

Appendix C Hydraulic Conductivity Testing Information

Well MW-05

Case 5 Well Penetrates to the Aquifer Bottom

(Slug In)

K gravel pack = K formation

No Gravel Pack Drainage

Definition Of Variables:

D : Saturated Aquifer Thickness
H : Depth of Water in the Well

H = Static Water Elev. - Elev. of Well Bottom

L: Length of Screen Below Water Table

Note: L = H if Water level is Below the Top of the Screen

C: Well Geometry Factor - from Bouwer & Rice, Figure 3

rc : Inner Radius of the Well casing rw : Radius of the Gravel Pack

Yo : Water Level Displacement at time = 0

t : Arbitrary Time from Recovery vs Time Plot

Yt: Water Level Displacement at time = t

Determined Values for Variables:

L=

D = 10.28 feet H = 10.28 feet

feet Notes:

H = D for this analysis

C = 6.6

rw not used in this analusis

rw = 0.344 feet L/rc = 120

10 feet

rc = 0.083 feet

Yo = 0.9 feet

t = 4 minutes

Yt = 0.05 feet

Calculations

(1/t)*ln(Yo/Yt) = 0.723

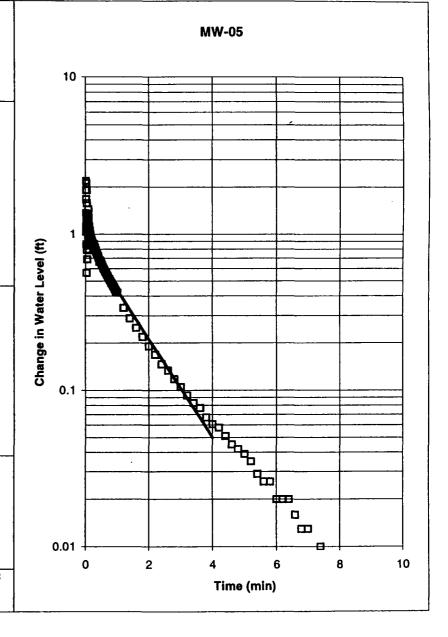
ln(Re/rc) = 1/(1.1/ln(H/rc)+C/(L/rc))

= 3.5331

 $K = (rc^*rc^*ln(Re/rc)^*(1/t)^*ln(Yo/Yt))/(2L)$

= 1.27 feet/da = 4.5 E-04 cm/sec

* Reference: Bouwer,H and Rice,R.C, 1976: A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells: Water Res. Res. V.12. No. 3



Well MW-05

Case 6: Well Penetrates to the Aquifer Bottom

(Slug in) K gravel pack >> K formation

Gravel Pack Drainage

Definition Of Variables:

D : Saturated Aquiler Thickness

H: Depth To the Bottom of the Gravel Pack minus the Static Depth to Water

L = H = D for Case 6

C: Well Geometry Factors - from Bouwer & Rice, Figure 3

rc : Inner Radius of the Well casing

rw : Radius of the Gravel Pack

Yo: Water Level Displacement at time = 0 t: Arbitrary Time from Recovery vs Time Plot

Yt: Water Level Displacement at time = t

Determined Values for Variables:

U =	10.28	1 00 t	
H =	10.28	feet	Notes:
L =	10.28	feet	L = H = D
C =	2.1		L/rw = 30
B =	0.4		
rw =	0.344	feet	
rc =	0.0833	feet	
Yo •	0.6	feet	
t =	6	minute	8

0.02 feet

Calculations

 $(1/t)^{\circ}\ln(Yo/Yt) = 0.56687$

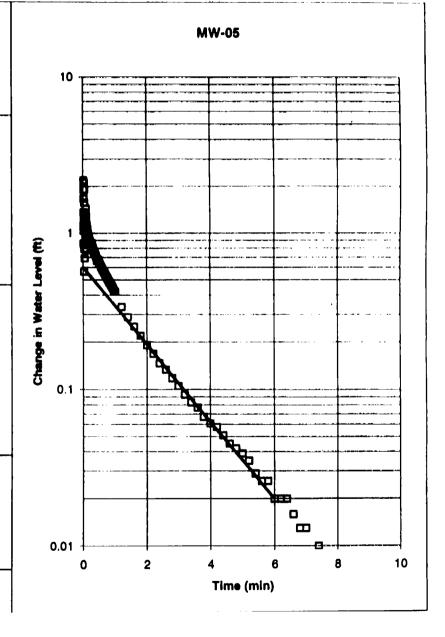
ln(Re/rw) = 1/[(1.1/ln(H/rw)+C/(L/rw)]

2.5377

K = [(rc*rc)+0.3*(rw*rw-rc*rc)]*ln(Re/rw)*(1/t)*ln(Yo/Yt))/(2L)

= 4.07 feet/da = 1.4 E-03 cm/sec

* Reference: Bouwer,H and Rice,R.C, 1976: A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells: Water Res. Res. V.12. No. 3



Well MW-05

Case 5 Well Penetrates to the Aquifer Bottom

(Slug Out)

K gravel pack = K formation No Gravel Pack Drainage

Definition Of Variables:

D : Saturated Aquifer Thickness
H : Depth of Water in the Well

H = Static Water Elev. - Elev. of Well Bottom

L: Length of Screen Below Water Table

Note: L = H if Water level is Below the Top of the Screen

C: Well Geometry Factor - from Bouwer & Rice, Figure 3

rc: Inner Radius of the Well casing rw: Radius of the Gravel Pack

Yo: Water Level Displacement at time = 0
t: Arbitrary Time from Recovery vs Time Plot
Yt: Water Level Displacement at time = t

Determined Values for Variables:

D =10.28 feet H = 10.28 feet Notes: H = D for this analysis L = 10 feet C = 6.6 rw not used in this analusis 0.344 feet L/rc = 1200.083 feet rc = Yo: 1 feet

Yo = 1 feet t = 3.5 minutes Yt = 0.04 feet

Calculations

 $(1/t)^* \ln(Yo/Yt) = 0.92$

ln(Re/rc) = 1/(1.1/ln(H/rc)+C/(L/rc))

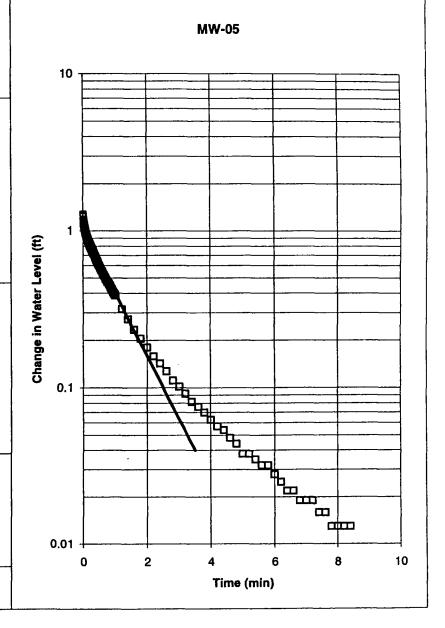
= 3.5331

K = (rc*rc*in(Re/rc)*(1/t)*in(Yo/Yt))/(2L)

= 1.61 feet/da = 5.7 E-04 cm/sec

* Reference: Bouwer,H and Rice,R.C, 1976: A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially

Penetrating Wells: Water Res. Res. V.12. No. 3



Well MW-05

Case 6: Well Penetrates to the Aquifer Bottom

(Slug Out)

K gravel pack >> K formation

Gravel Pack Drainage

Definition Of Variables:

D : Saturated Aquifer Thickness

H : Depth To the Bottom of the Gravel Pack minus the Static Depth to Water

L = H = D for Case 6

C: Well Geometry Factors - from Bouwer & Rice, Figure 3

rc : Inner Radius of the Well casing rw : Radius of the Gravel Pack

Yo : Water Level Displacement at time = 0 t : Arbitrary Time from Recovery vs Time Plot

Yt: Water Level Displacement at time = t

Determined Values for Variables:

D =	10.28	feet	
H =	10.28	feet	Notes:
L =	10.28	feet	L = H = D
C =	2.1		L/rw = 30
B =	0.4		
rw =	0.344	feet	
rc =	0.0833	feet	
Yo =	0.4	feet	
t =	7.2	minute	88
Yt =	0.015	feet	

Calculations

 $(1/t)^*\ln(Yo/Yt) = 0.45603$

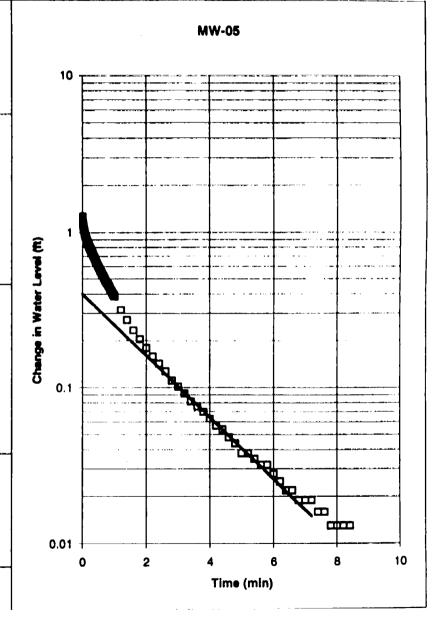
ln(Re/rw) = 1/[(1.1/ln(H/rw)+C/(L/rw)]

= 2.5377

K = [(rc*rc)+0.3*(rw*rw-rc*rc)]*ln(Re/rw)*(1/t)*ln(Yo/Yt))/(2L)

= 3.27 feet/da = 1.2 E-03 cm/sec

* Reference: Bouwer,H and Rice,R.C, 1976: A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells: Water Res. Res. V.12. No. 3



Well MW-06

Case 5 Well Penetrates to the Aquifer Bottom

(Slug In)

K gravel pack = K formation No Gravel Pack Drainage

Definition Of Variables:

D : Saturated Aquifer Thickness

H: Depth of Water in the Well

H = Static Water Elev. - Elev. of Well Bottom

L: Length of Screen Below Water Table

Note: L = H if Water level is Below the Top of the Screen

C: Well Geometry Factor - from Bouwer & Rice, Figure 3

rc : Inner Radius of the Well casing rw : Radius of the Gravel Pack

Yo: Water Level Displacement at time = 0 t: Arbitrary Time from Recovery vs Time Plot

Yt: Water Level Displacement at time = t

Determined Values for Variables:

D = 12.93 feet

H = 12.93 feet Notes:

L = 10 feet H = D for this analysis

C = 6.6 rw not used in this analusis

rw = 0.344 feet L/rc = 120

rc = 0.083 feet Yo: 1 feet

t = 10 minutes

Yt = 0.06 feet

Calculations

(1/t)*ln(Yo/Yt) = 0.281

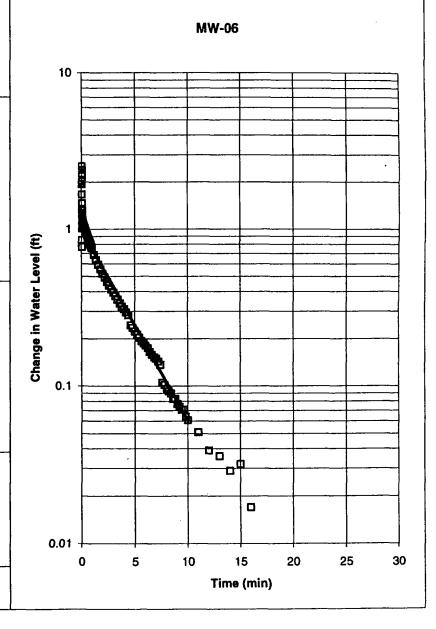
ln(Re/rc) = 1/(1.1/ln(H/rc)+C/(L/rc))

= 3.66746

K = (rc*rc*ln(Re/rc)*(1/t)*ln(Yo/Yt))/(2L)

= 0.51 feet/da = 1.8 E-04 cm/sec

* Reference: Bouwer,H and Rice,R.C, 1976: A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells: Water Res. Res. V.12. No. 3



Well MW-08

Case 5 Well Penetrates to the Aguiler Bottom

(Slug Out)

K gravel pack = K formation No Gravel Pack Drainage

Definition Of Variables:

D : Saturated Agulfer Thickness H : Depth of Water in the Well

H = Static Water Elev. - Elev. of Well Bottom

L: Length of Screen Below Water Table

Note: L = H if Water level is Below the Top of the Screen

C: Well Geometry Factor - from Bouwer & Rice, Figure 3

rc: Inner Radius of the Well casing

rw : Radius of the Gravel Pack

Yo: Water Level Displacement at time = 0 t : Arbitrary Time from Recovery vs Time Plot

Yt: Water Level Displacement at time = t

Determined Values for Variables:

U =	12.83 1881	
H =	12.93 feet	Notes:
_		

H = D for this analysis 10 feet L=

C =8.8 rw not used in this analusis

rw = 0.344 feet L/rc = 120

0.083 feet rc =

Yo: 1.2 feet

10 minutes t =

Yt = 0.1 feet

Calculations

 $(1/t)^{1}\ln(Yo/Yt)$

0.248

In(Re/rc)

 $= 1/(1.1/\ln(H/rc)+C/(L/rc))$

3.66746

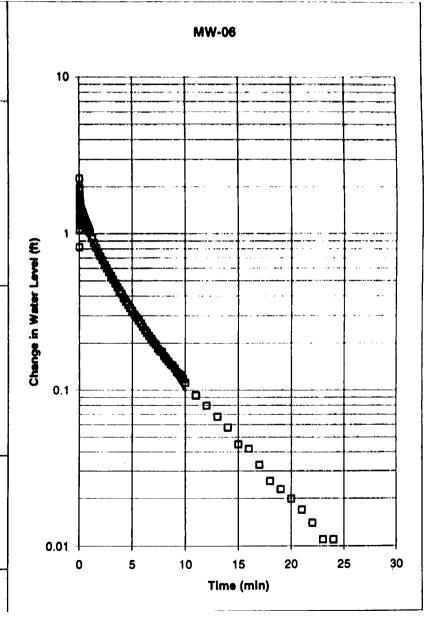
Κ

= (rc*rc*ln(Re/rc)*(1/t)*ln(Yo/Yt))/(2L)

0.45 feet/da

1.6 E-04 cm/sec

* Reference: Bouwer,H and Rice,R.C, 1976: A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells: Water Res. Res. V.12. No. 3



Well MW-06

Case 6: Well Penetrates to the Aquifer Bottom

(Slug Out)

K gravel pack >> K formation

Gravel Pack Drainage

Definition Of Variables:

D : Saturated Aquifer Thickness

H: Depth To the Bottom of the Gravel Pack minus the Static Depth to Water

L = H = D for Case 6

C: Well Geometry Factors - from Bouwer & Rice, Figure 3

rc: Inner Radius of the Well casing rw: Radius of the Gravel Pack

Yo: Water Level Displacement at time = 0 t: Arbitrary Time from Recovery vs Time Plot

Yt: Water Level Displacement at time = t

Determined Values for Variables:

D = 12.93 feet H = 12.93 feet Notes: L = 12.93 feet L = H = D C = 2.2 L/rw = 38 B = 0.4 rw = 0.344 feet

rc = 0.0833 feet Yo = 0.25 feet t = 25 minutes Yt = 0.018 feet

Calculations

 $(1/t)^*\ln(Yo/Yt) = 0.10524$

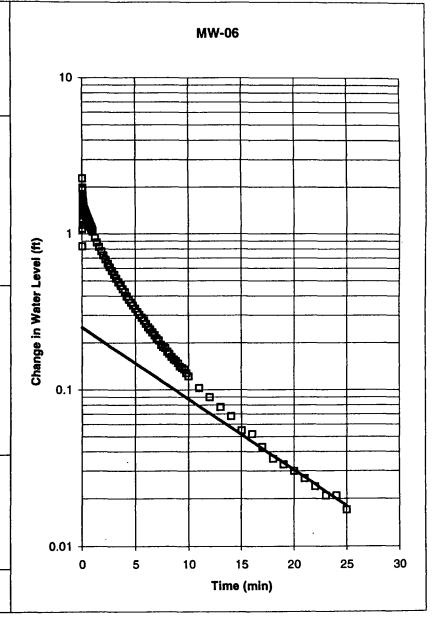
ln(Re/rw) = 1/[(1.1/ln(H/rw)+C/(L/rw)]

= 2.76366

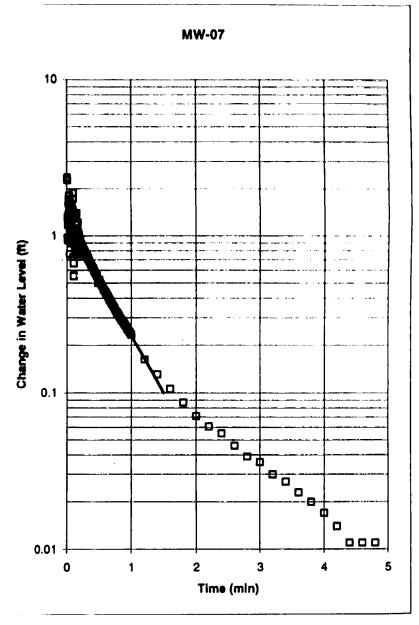
= 0.65 feet/da = 2.3 E-04 cm/sec

* Reference: Bouwer,H and Rice,R.C, 1976: A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially

Penetrating Wells: Water Res. Res. V.12. No. 3



Bouwer and Rice Slug Test Calculations * Well MW-07 Case 5 Well Penetrates to the Aquifer Bottom K gravel pack = K formation (Slug In) No Gravel Pack Drainage **Definition Of Variables:** D : Saturated Aquifer Thickness H : Depth of Water in the Well H = Static Water Elev. - Elev. of Well Bottom L: Length of Screen Below Water Table Note: L = H if Water level is Below the Top of the Screen C: Well Geometry Factor - from Bouwer & Rice, Figure 3 rc: Inner Radius of the Well casing rw: Radius of the Gravel Pack Yo: Water Level Displacement at time = 0 t : Arbitrary Time from Recovery vs Time Plot Yt: Water Level Displacement at time = t Determined Values for Variables: D. 11.57 leet H = 11.57 feet Notes: H = D for this analysis L = 10 feet rw not used in this analusis C= 6.6 0.344 feet L/rc = 120rc = 0.083 feet Yo: 1.2 feet 1.5 minutes t = Yt = 0.1 feet Calculations $(1/t)^{\circ} ln(Yo/Yt)$ 1.657 In(Re/rc) = 1/(1.1/ln(H/rc)+C/(L/rc))3.60266 Κ = (rc*rc*ln(Re/rc)*(1/t)*ln(Yo/Yt))/(2L)2.96 feet/da 1.0 E-03 cm/sec * Reference: Bouwer,H and Rice,R.C, 1976: A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells: Water Res. Res. V.12. No. 3



Well MW-07

Case 6: Well Penetrates to the Aquifer Bottom

(Slug In)

K gravel pack >> K formation

Gravel Pack Drainage

Definition Of Variables:

D : Saturated Aquifer Thickness

H: Depth To the Bottom of the Gravel Pack minus

the Static Depth to Water

L = H = D for Case 6

C: Well Geometry Factors - from Bouwer & Rice, Figure 3

rc: Inner Radius of the Well casing rw: Radius of the Gravel Pack

Yo: Water Level Displacement at time = 0

t : Arbitrary Time from Recovery vs Time Plot

Yt: Water Level Displacement at time = t

Determined Values for Variables:

11.57 feet

H= 11.57 feet Notes:

L= 11.57 feet L = H = D

C = 2.1 L/rw = 34

0.4 B =

0.344 feet

0.0833 feet rc =

Yo = 0.3 feet

t = 4 minutes

Yt = 0.018 feet

Calculations

(1/t)*In(Yo/Yt) =0.70335

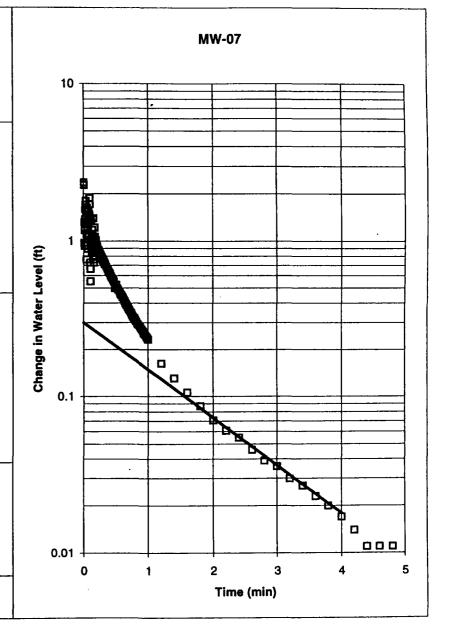
= 1/[(1.1/ln(H/rw)+C/(L/rw)]In(Re/rw)

2.66429

= [(rc*rc)+0.3*(rw*rw-rc*rc)]*ln(Re/rw)*(1/t)*ln(Yo/Yt))/(2L)Κ

4.71 feet/da = 1.7 E-03 cm/sec

* Reference: Bouwer,H and Rice,R.C, 1976: A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells: Water Res. Res. V.12. No. 3



Well MW-07

Case 5 Well Penetrates to the Aquifer Bottom

(Slug Out)

K gravel pack = K formation No Gravel Pack Drainage

Definition Of Variables:

D : Saturated Aquiler Thickness
H : Depth of Water in the Weil

H = Static Water Elev. - Elev. of Well Bottom

L: Length of Screen Below Water Table

Note: L = H if Water level is Below the Top of the Screen

C: Well Geometry Factor - from Bouwer & Rice, Figure 3

rc : Inner Radius of the Well casing rw : Radius of the Gravel Pack

Yo: Water Level Displacement at time = 0 t: Arbitrary Time from Recovery vs Time Plot

Yt : Water Level Displacement at time = t

Determined Values for Variables:

D = 11.57 feet H = 11.57 feet

11 57 feet Notes: 10 feet H = D f

L = 10 feet H = D for this analysis C = 6.6 rw not used in this ana

C = 6.6 rw not used in this analusis

rw = 0.344 feet L/rc = 120

rc = 0.083 feet

Yo : 1.35 feet

t = 1.55 minutes

Yt = 0.1 feet

Calculations

(1/t) 'In(Yo/Yt)

1.679

In(Re/rc)

 $= 1/(1.1/\ln(H/rc)+C/(L/rc))$

3.60266

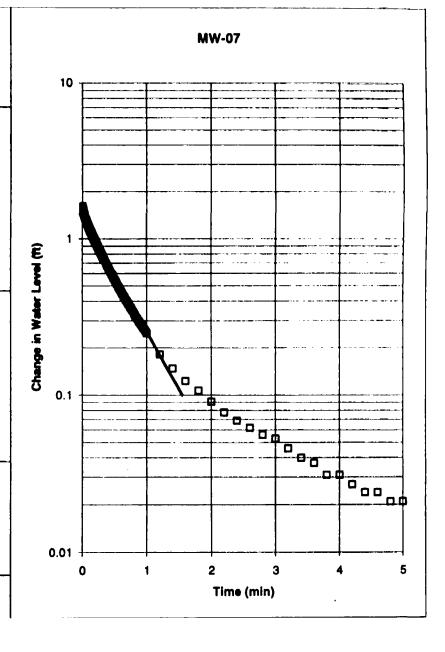
Κ

= (rc*rc*ln(Re/rc)*(1/t)*ln(Yo/Yt))/(2L)

= 3.00 feet/da

= 1.1 E-03 cm/sec

* Reference: Bouwer,H and Rice,R.C, 1976: A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells: Water Res. Res. V.12. No. 3



Well MW-07

Case 6: Well Penetrates to the Aquifer Bottom

(Slug Out)

K gravel pack >> K formation

Gravel Pack Drainage

Definition Of Variables:

D : Saturated Aquifer Thickness

H: Depth To the Bottom of the Gravel Pack minus

the Static Depth to Water

L = H = D for Case 6

C: Well Geometry Factors - from Bouwer & Rice, Figure 3

rc : Inner Radius of the Well casing rw : Radius of the Gravel Pack

Yo: Water Level Displacement at time = 0
t: Arbitrary Time from Recovery vs Time Plot
Yt: Water Level Displacement at time = t

Determined Values for Variables:

D = 11.57 feet H≖ 11.57 feet Notes: 11.57 feet L = H = D L = C= 2.1 L/rw = 34B = 0.4 rw = 0.344 feet 0.0833 feet rc = Yo = 0.26 feet

5 minutes

0.018 feet

Calculations

 $(1/t)^{1}\ln(Yo/Yt) = 0.53406$

t =

Yt ≈

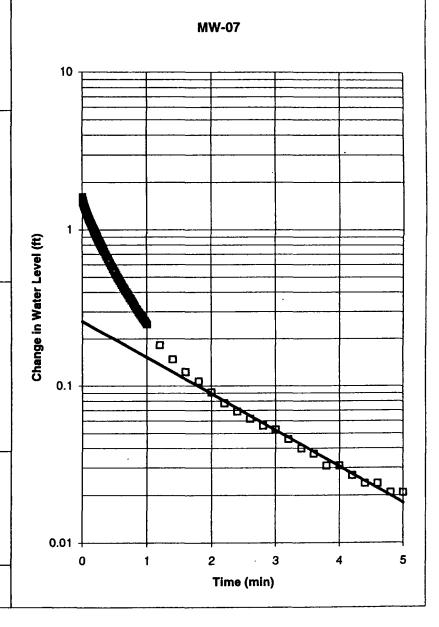
ln(Re/rw) = 1/[(1.1/ln(H/rw)+C/(L/rw)]

2.66429

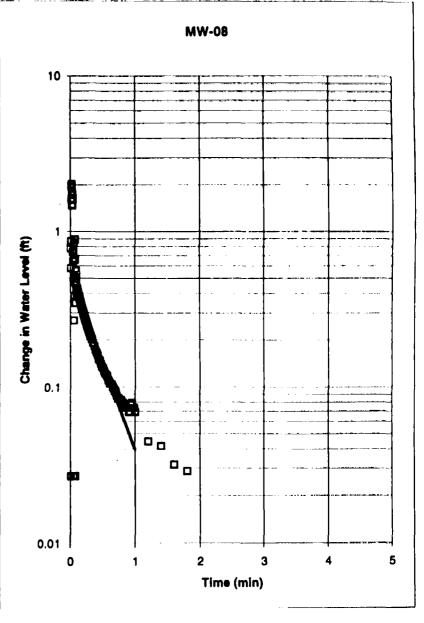
K = [(rc*rc)+0.3*(rw*rw-rc*rc)]*ln(Re/rw)*(1/t)*ln(Yo/Yt))/(2L)

= 3.57 feet/da = 1.3 E-03 cm/sec

* Reference: Bouwer,H and Rice,R.C, 1976: A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells: Water Res. Res. V.12. No. 3



Bouwer and Rice Slug Test Calculations * Well MW-08 Case 5 Well Penetrates to the Aquifer Bottom K gravel pack = K formation (Slug In) No Gravel Pack Drainage Definition Of Variables: D : Saturated Aquifer Thickness H: Depth of Water in the Well H = Static Water Elev. - Elev. of Well Bottom L: Length of Screen Below Water Table Note: L = H if Water level is Below the Top of the Screen C: Well Geometry Factor - from Bouwer & Rice, Figure 3 rc: Inner Radius of the Well casing rw : Radius of the Gravel Pack Yo: Water Level Displacement at time = 0 t : Arbitrary Time from Recovery vs Time Plot Yt: Water Level Displacement at time = t Determined Values for Variables: D = 13.26 feet H = 13.26 feet Notes: H = D for this analysis 10 feet L = C =6.6 rw not used in this analusis 0.344 feet L/rc = 120 rw = 0.083 feet rc = Yo: 0.5 feet t = 1 minutes 0.04 feet Yt = Calculations (1/t)*In(Yo/Yt) 2.526 In(Re/rc) $= 1/(1.1/\ln(H/rc)+C/(L/rc))$ 3.68208 Κ = (rc*rc*ln(Re/rc)*(1/t)*ln(Yo/Yt))/(2L)4.61 feet/da 1.6 E-03 cm/sec * Reference: Bouwer,H and Rice,R.C, 1976: A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells: Water Res. Res. V.12. No. 3



Well MW-08

Case 6: Well Penetrates to the Aguifer Bottom

(Slug In)

K gravel pack >> K formation

Gravel Pack Drainage

Definition Of Variables:

D : Saturated Aquifer Thickness

H: Depth To the Bottom of the Gravel Pack minus

the Static Depth to Water

L = H = D for Case 6

C: Well Geometry Factors - from Bouwer & Rice, Figure 3

rc : Inner Radius of the Well casing rw : Radius of the Gravel Pack

Yo: Water Level Displacement at time = 0

t : Arbitrary Time from Recovery vs Time Plot

Yt: Water Level Displacement at time = t

Determined Values for Variables:

D = 13.26 feet H = 13.26 feet Notes: 13.26 feet L = H = D L = C = 2.2 L/rw = 39B = 0.4 0.344 feet rw = 0.0833 feet rc = 0.15 feet Yo = 3 minutes t = Yt = 0.01 feet

Calculations

(1/t)*ln(Yo/Yt) = 0.90268

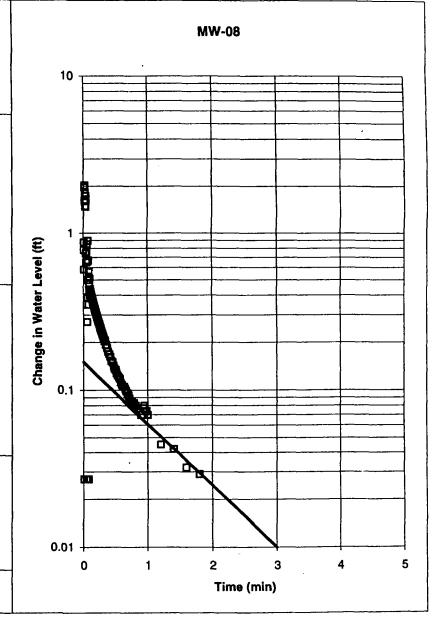
ln(Re/rw) = 1/[(1.1/ln(H/rw)+C/(L/rw)]

= 2.79104

= [(rc*rc)+0.3*(rw*rw-rc*rc)]*ln(Re/rw)*(1/t)*ln(Yo/Yt))/(2L)

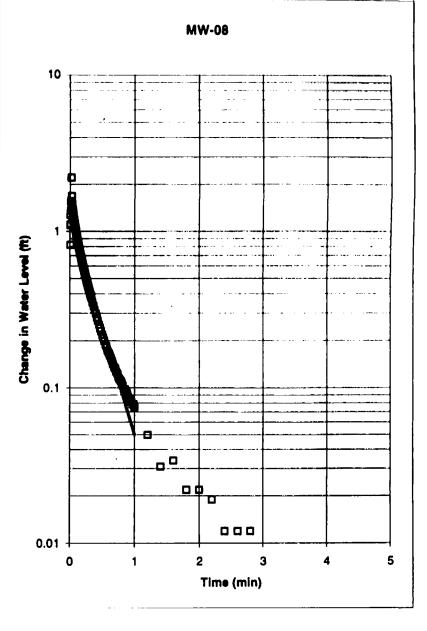
= 5.52 feet/da = 1.9 E-03 cm/sec

* Reference: Bouwer,H and Rice,R.C, 1976: A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells: Water Res. Res. V.12. No. 3



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Bouwer and Rice Slug Test Calculations * Well MW-08 Case 5 Well Penetrates to the Aguiler Bottom (Slug Out) K gravel pack = K formation No Gravel Pack Drainage Definition Of Variables: D : Saturated Aquifer Thickness H: Depth of Water in the Well H = Static Water Elev. - Elev. of Well Bottom L: Length of Screen Below Water Table Note: L = H if Water level is Below the Top of the Screen C: Well Geometry Factor - from Bouwer & Rice, Figure 3 rc : Inner Radius of the Well casing rw : Radius of the Gravel Pack Yo: Water Level Displacement at time = 0 t : Arbitrary Time from Recovery vs Time Plot Yt: Water Level Displacement at time = t Determined Values for Variables: 13.26 feet 13.26 feet Notes: 10 feet H = D for this analysis L = C= 6.6 rw not used in this analusis 0.344 feet L/rc = 120 rw = 0.083 feet rc = Yo: 1.2 feet 1 = 1 minutes Yt = 0.05 feet Calculations 3.178 (1/t)*In(Yo/Yt) $= 1/(1.1/\ln(H/rc)+C/(L/rc))$ In(Re/rc) 3.68208 Κ = (rc*rc*ln(Re/rc)*(1/t)*ln(Yo/Yt))/(2L)5.80 feet/da 2.0 E-03 cm/sec * Reference: Bouwer,H and Rice,R.C, 1976: A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells: Water Res. Res. V.12. No. 3



Well MW-08

Case 6: Well Penetrates to the Aquifer Bottom

(Slug Out)

K gravel pack >> K formation

Gravel Pack Drainage

Definition Of Variables:

D : Saturated Aquifer Thickness

H: Depth To the Bottom of the Gravel Pack minus the Static Depth to Water

L = H = D for Case 6

C: Well Geometry Factors - from Bouwer & Rice, Figure 3

rc : Inner Radius of the Well casing rw : Radius of the Gravel Pack

Yo : Water Level Displacement at time = 0

t : Arbitrary Time from Recovery vs Time Plot

Yt: Water Level Displacement at time = t

Determined Values for Variables:

D = 13.26 feet

H = 13.26 feet Notes:

L = 13.26 feet L = H = D

C = 2.2 L/rw = 39

B = 0.4

rw = 0.344 feet

rc = 0.0833 feet

Yo = 0.14 feet

t = 2.8 minutes

Yt = 0.01 feet

Calculations

 $(1/t)^{1}\ln(Yo/Yt) = 0.94252$

ln(Re/rw) = 1/[(1.1/ln(H/rw)+C/(L/rw)]

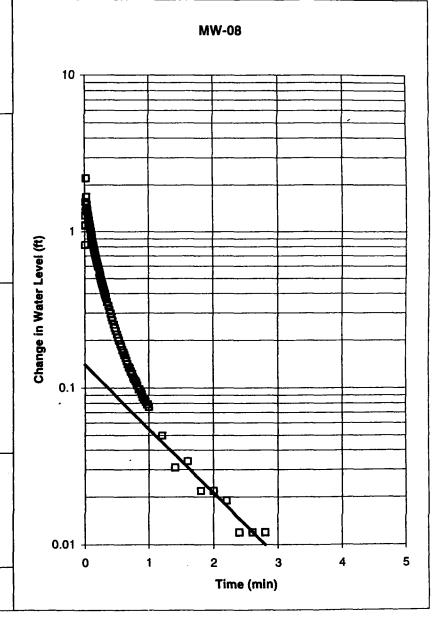
= 2.79104

 $K = [(rc^*rc)+0.3^*(rw^*rw-rc^*rc)]^*ln(Re/rw)^*(1/t)^*ln(Yo/Yt))/(2L)$

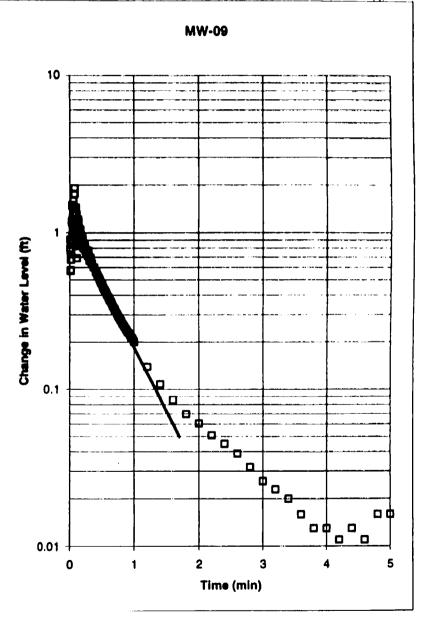
= 5.76 feet/da = 2.0 E-03 cm/sec

* Reference: Bouwer,H and Rice,R.C, 1976: A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially

Penetrating Wells: Water Res. Res. V.12. No. 3



Bouwer and Rice Slug Test Calculations * Well MW-09 Case 5 Well Penetrates to the Aquifer Bottom (Slug In) K gravel pack = K formation No Gravel Pack Drainage **Definition Of Variables:** D : Saturated Aquifer Thickness H: Depth of Water in the Well H = Static Water Elev. - Elev. of Well Bottom L: Length of Screen Below Water Table Note: L = H if Water level is Below the Top of the Screen C: Well Geometry Factor - from Bouwer & Rice, Figure 3 rc: Inner Radius of the Well casing rw : Radius of the Gravel Pack Yo: Water Level Displacement at time = 0 t : Arbitrary Time from Recovery vs Time Plot Yt: Water Level Displacement at time = t Determined Values for Variables: 11.71 feet H= 11.71 feet Notes: L = 10 feet H = D for this analysis C = 6.6 rw not used in this analusis 0.344 feet L/rc = 1200.083 feet rc = Yo : 1.2 feet t = 1.7 minutes Yt = 0.05 feet Calculations $(1/t)^{4}\ln(Yo/Yt)$ 1.869 = 1/(1.1/ln(H/rc)+C/(L/rc))In(Re/rc) 3.6097 K = $(rc^*rc^*ln(Re/rc)^*(1/t)^*ln(Yo/Yt))/(2L)$ 3.35 feet/da 1.2 E-03 cm/sec * Reference: Bouwer,H and Rice,R.C, 1976: A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells: Water Res. Res. V.12. No. 3



Well MW-09

Case 6: Well Penetrates to the Aquifer Bottom

(Slug In)

K gravel pack >> K formation

Gravel Pack Drainage

Definition Of Variables:

D : Saturated Aquifer Thickness

H: Depth To the Bottom of the Gravel Pack minus

the Static Depth to Water

L = H = D for Case 6

C: Well Geometry Factors - from Bouwer & Rice, Figure 3

rc: Inner Radius of the Well casing rw: Radius of the Gravel Pack

Yo : Water Level Displacement at time = 0

t: Arbitrary Time from Recovery vs Time Plot

Yt: Water Level Displacement at time = t

Determined Values for Variables:

D =	11.71	feet	
H =	11.71	feet	Notes:
L=	11.71	feet	L = H = D
C =	2.1		L/rw = 34
B =	0.4		
rw =	0.344	feet	•
rc =	0.0833	feet	
Yo =	0.26	feet	
t =	4.3	minute	es
Yt =	0.01	feet	

Calculations

(1/t)*ln(Yo/Yt) = 0.7577

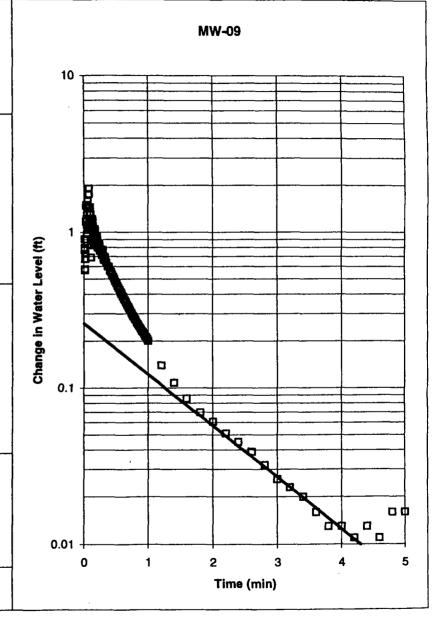
ln(Re/rw) = 1/[(1.1/ln(H/rw)+C/(L/rw)]

= 2.67722

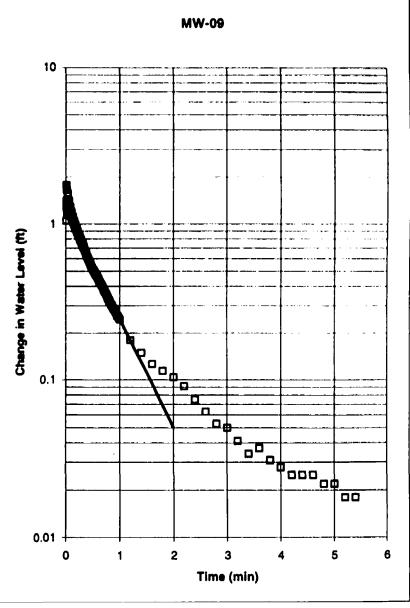
K = [(rc*rc)+0.3*(rw*rw-rc*rc)]*ln(Re/rw)*(1/t)*ln(Yo/Yt))/(2L)

= 5.03 feet/da = 1.8 E-03 cm/sec

* Reference: Bouwer,H and Rice,R.C, 1976: A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells: Water Res. Res. V.12. No. 3



Bouwer and Rice Slug Test Calculations * Well MW-09 Case 5 Well Penetrates to the Aguifer Bottom (Slug Out) K gravel pack = K formation No Gravel Pack Drainage **Definition Of Variables:** D : Saturated Aquifer Thickness H : Depth of Water in the Well H = Static Water Elev. - Elev. of Well Bottom L: Length of Screen Below Water Table Note: L = H if Water level is Below the Top of the Screen C: Well Geometry Factor - from Bouwer & Rice, Figure 3 rc: Inner Radius of the Well casing rw : Radius of the Gravel Pack Yo: Water Level Displacement at time = 0 t : Arbitrary Time from Recovery vs Time Plot Yt: Water Level Displacement at time = t Determined Values for Variables: D = 11.71 leet H = 11.71 feet Notes: H = D for this analysis 10 feet C = 6.6 rw not used in this analusis 0.344 feet L/rc = 1200.083 feet rc = 1.2 feet You t = 2 minutes 0.05 feet Yt = Calculations (1/t)'In(Yo/Yt) 1.589 $= 1/(1.1/\ln(H/rc)+C/(L/rc))$ In(Re/rc) 3.6097 = $(rc^*rc^*ln(Re/rc)^*(1/t)^*ln(Yo/Yt))/(2L)$ 2.85 feet/da 1.0 E-03 cm/sec * Reference: Bouwer,H and Rice,R.C, 1976: A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells: Water Res. Res. V.12. No. 3



Well MW-09

Case 6: Well Penetrates to the Aquifer Bottom

(Slug Out)

K gravel pack >> K formation

Gravel Pack Drainage

Definition Of Variables:

D : Saturated Aquifer Thickness

H: Depth To the Bottom of the Gravel Pack minus

the Static Depth to Water

L = H = D for Case 6

C: Well Geometry Factors - from Bouwer & Rice, Figure 3

rc : Inner Radius of the Well casing

rw : Radius of the Gravel Pack

Yo: Water Level Displacement at time = 0

t : Arbitrary Time from Recovery vs Time Plot

Yt: Water Level Displacement at time = t

Determined Values for Variables:

D = 11.71 feet H= 11.71 feet Notes: 11.71 feet L = H = D L/rw = 342.1 0.4 B = 0.344 feet 0.0833 feet 0.3 feet Yo = t = 5 minutes

0.015 feet

Calculations

 $(1/t)^* \ln(Yo/Yt) = 0.59915$

Yt =

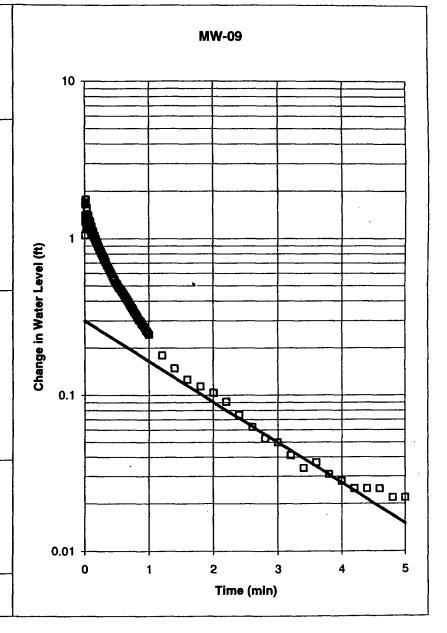
ln(Re/rw) = 1/[(1.1/ln(H/rw)+C/(L/rw)]

= 2.67722

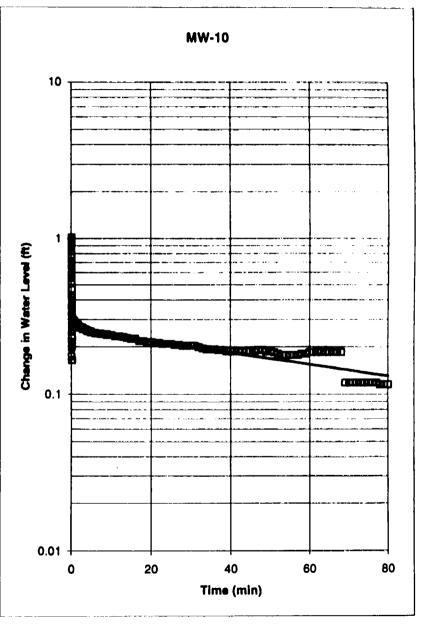
K = [(rc*rc)+0.3*(rw*rw-rc*rc)]*ln(Re/rw)*(1/t)*ln(Yo/Yt))/(2L)

= 3.98 feet/da = 1.4 E-03 cm/sec

* Reference: Bouwer,H and Rice,R.C, 1976: A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells: Water Res. Res. V.12. No. 3



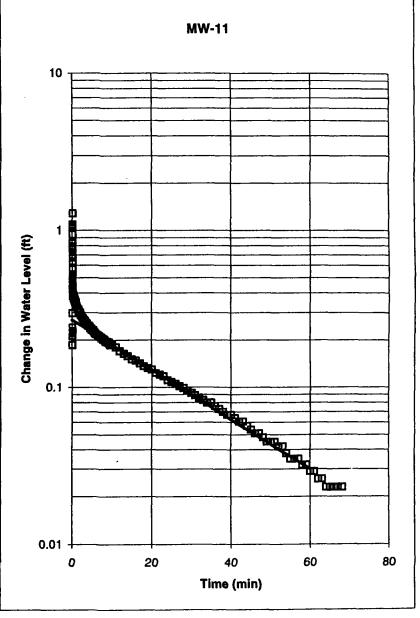
Bouwer and Rice Slug Test Calculations * Well MW-10 Case 6: Well Penetrates to the Aquifer Bottom (Slug in) K gravel pack >> K formation Gravel Pack Drainage **Definition Of Variables:** D : Saturated Aquifer Thickness H: Depth To the Bottom of the Gravel Pack minus the Static Depth to Water L = H = D for Case 6 C: Well Geometry Factors - from Bouwer & Rice, Figure 3 rc : Inner Radius of the Well casing rw : Radius of the Gravel Pack Yo: Water Level Displacement at time = 0 t : Arbitrary Time from Recovery vs Time Plot Yt: Water Level Displacement at time = t Determined Values for Variables: D = 8.53 feet H= 8.53 feet Notes: 8.53 feet L=H=D C =1.9 L/rw = 250.3 0.344 feet rc = 0.0833 feet 0.26 feet Yo. t = 80 minutes Yt = 0.13 feet Calculations $(1/1)^{4}\ln(Yo/Y1) =$ 0.00866 in(Re/rw) = 1/[(1.1/ln(H/rw)+C/(L/rw)]2.38534 = [(rc*rc)+0.3*(rw*rw-rc*rc)]*in(Re/rw)*(1/t)*in(Yo/Yt))/(2L)0.07 feet/da 2.5 E-05 cm/sec * Reference: Bouwer,H and Rice,R.C, 1976: A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells: Water Res. Res. V.12. No. 3



Bouwer and Rice Slug Test Calculations * Well MW-11 Case 6: Well Penetrates to the Aquifer Bottom K gravel pack >> K formation (Slug In) **Gravel Pack Drainage** Definition Of Variables: D : Saturated Aquifer Thickness H: Depth To the Bottom of the Gravel Pack minus the Static Depth to Water L = H = D for Case 6 C: Well Geometry Factors - from Bouwer & Rice, Figure 3 rc: Inner Radius of the Well casing rw: Radius of the Gravel Pack Yo: Water Level Displacement at time = 0 t : Arbitrary Time from Recovery vs Time Plot Yt: Water Level Displacement at time = t **Determined Values for Variables:** D = 7.57 feet H= 7.57 feet Notes: L = H = DL = 7.57 feet 1.75 L/rw = 22C =B = 0.3 0.344 feet rc = 0.0833 feet Yo = 0.27 feet 60 minutes t = Yt ≈ 0.03 feet Calculations (1/t)*In(Yo/Yt) = 0.03662 In(Re/rw) = 1/[(1.1/ln(H/rw)+C/(L/rw)]2.29694 K = [(rc*rc)+0.3*(rw*rw-rc*rc)]*in(Re/rw)*(1/t)*in(Yo/Yt))/(2L)= 1.1 E-04 cm/sec 0.32 feet/da * Reference: Bouwer, H and Rice, R.C, 1976: A Slug Test for Determining Hydraulic

Conductivity of Unconfined Aquifers With Completely or Partially

Penetrating Wells: Water Res. Res. V.12. No. 3



Bouwer and Rice Slug Test Calculations *

Well MW-11

Case 6: Well Penetrates to the Aquifer Bottom

(Slug Out)

K gravel pack >> K formation

Gravel Pack Drainage

Definition Of Variables:

D : Saturated Aquifer Thickness

H: Depth To the Bottom of the Gravel Pack minus the Static Depth to Water

L = H = D for Case 6

C: Well Geometry Factors - from Bouwer & Rice, Figure 3

rc : Inner Radius of the Well casing rw : Radius of the Gravel Pack

Yo : Water Level Displacement at time = 0

t : Arbitrary Time from Recovery vs Time Plot

Yt: Water Level Displacement at time = t

Determined Values for Variables:

7.37	1991	
7.57	feet	Notes:
7.57	feet	L = H = D
1.75		L/rw = 22
0.3		
0.344	feet	
0.0833	feet	
0.24	feet	
80	minute	8
	7.57 7.57 1.75 0.3 0.344 0.0833 0.24	7.57 feet 7.57 feet 1.75 0.3 0.344 feet 0.0833 feet 0.24 feet 80 minute

0.03 feet

Calculations

 $(1/t)^*\ln(Yo/Yt) = 0.02599$

Yt =

ln(Re/rw) = 1/[(1.1/ln(H/rw)+C/(L/rw)]

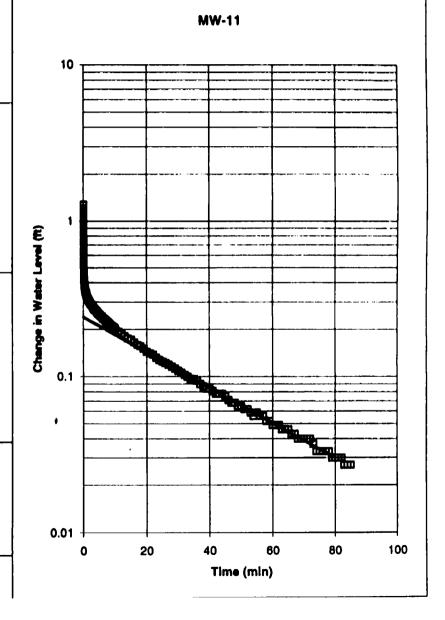
= 2.29694

 $= \{(rc^*rc) + 0.3^*(rw^*rw - rc^*rc)\}^* \ln(Re/rw)^*(1/t)^* \ln(Yo/Yt))/(2L)$

= 0.23 feet/da = 8.1 E-05 cm/sec

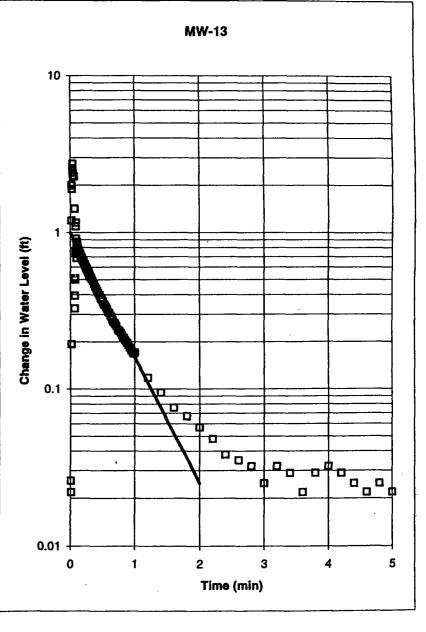
* Reference: Bouwer,H and Rice,R.C, 1976: A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially

Penetrating Wells: Water Res. Res. V.12. No. 3



Bouwer and Rice Slug Test Calculations * Case 5 Well Penetrates to the Aquifer Bottom Well MW-13 K gravel pack = K formation (Slug In) No Gravel Pack Drainage **Definition Of Variables:** D : Saturated Aquifer Thickness H: Depth of Water in the Well H = Static Water Elev. - Elev. of Well Bottom L: Length of Screen Below Water Table Note: L = H if Water level is Below the Top of the Screen C: Well Geometry Factor - from Bouwer & Rice, Figure 3 rc: Inner Radius of the Well casing rw: Radius of the Gravel Pack Yo: Water Level Displacement at time = 0 t : Arbitrary Time from Recovery vs Time Plot Yt: Water Level Displacement at time = t **Determined Values for Variables:** 12.99 feet 12.99 feet Notes: 10 feet H = D for this analysis C =6.6 rw not used in this analusis 0.344 feet L/rc = 1200.083 feet rc = Yo: 1 feet 2 minutes t = Yt = 0.025 feet Calculations (1/t)*In(Yo/Yt) 1.844 In(Re/rc) $= 1/(1.1/\ln(H/rc) + C/(L/rc))$ 3.67015 Κ = (rc*rc*ln(Re/rc)*(1/t)*ln(Yo/Yt))/(2L)3.36 feet/da 1.2 E-03 cm/sec * Reference: Bouwer, H and Rice, R.C, 1976: A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially

Penetrating Wells: Water Res. Res. V.12. No. 3



Bouwer and Rice Slug Test Calculations *

Well MW-13

Case 6: Well Penetrates to the Aquifer Bottom

(Slug in)

K gravel pack >> K formation

Gravel Pack Drainage

Definition Of Variables:

D : Saturated Aquifer Thickness

H: Depth To the Bottom of the Gravel Pack minus

the Static Depth to Water

L = H = D for Case 6

C: Well Geometry Factors - from Bouwer & Rice, Figure 3

rc : Inner Radius of the Well casing

rw : Radius of the Gravel Pack

Yo: Water Level Displacement at time = 0
t: Arbitrary Time from Recovery va Time Plot

Yt: Water Level Displacement at time = t

Determined Values for Variables:

D = 12.99 feet

H = 12.99 feet Notes:

L= 12.99 feet L=H=D

C = 2.5 L/rw = 38

B = 0.4

rw = 0.344 feet

rc = 0.0833 feet

Yo = 0.26 feet

t = 4 minutes

Yt = 0.012 feet

Calculations

 $(1/t)^{\circ}\ln(Yo/Yt) = 0.76894$

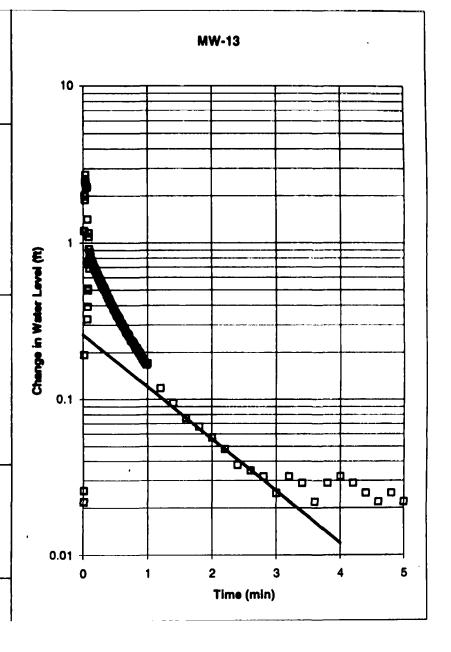
 $\ln(\text{Re/rw}) = 1/[(1.1/\ln(H/\text{rw})+C/(L/\text{rw})]$

= 2.70909

K = [(rc*rc)+0.3*(rw*rw-rc*rc)]*ln(Re/rw)*(1/t)*ln(Yo/Yt))/(2L)

= 4.86 feet/da = 1.8 E-03 cm/sec

* Reference: Bouwer,H and Rice,R.C, 1976: A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells: Water Res. Res. V.12. No. 3



Bouwer and Rice Slug Test Calculations * Case 5 Well Penetrates to the Aquifer Bottom Well MW-13 (Slug Out)

K gravel pack = K formation No Gravel Pack Drainage

Definition Of Variables:

D: Saturated Aquifer Thickness H: Depth of Water in the Well

H = Static Water Elev. - Elev. of Well Bottom

L: Length of Screen Below Water Table

Note: L = H if Water level is Below the Top of the Screen

C: Well Geometry Factor - from Bouwer & Rice, Figure 3

rc: Inner Radius of the Well casing rw: Radius of the Gravel Pack

Yo: Water Level Displacement at time = 0 t : Arbitrary Time from Recovery vs Time Plot Yt: Water Level Displacement at time = t

Determined Values for Variables:

12.99 feet 12.99 feet H= Notes: H = D for this analysis 10 feet L= rw not used in this analusis C= 6.6 L/rc = 1200.344 feet rw = 0.083 feet rc = Yo: 1 feet 1.5 minutes t = Yt = 0.045 feet

Calculations

2.067 (1/t)*In(Yo/Yt)

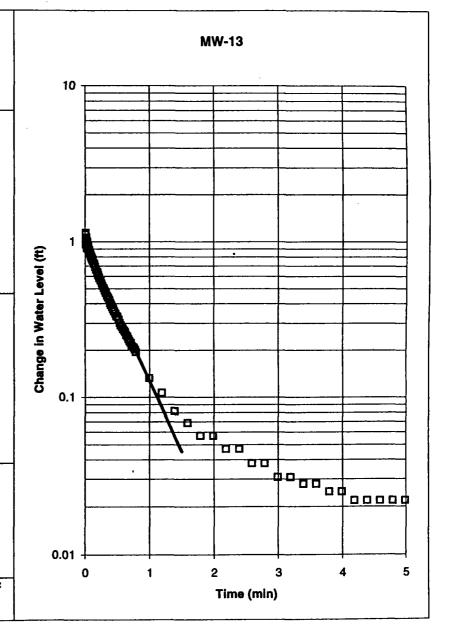
In(Re/rc) $= 1/(1.1/\ln(H/rc)+C/(L/rc))$

3.67015

Κ = (rc*rc*ln(Re/rc)*(1/t)*ln(Yo/Yt))/(2L)

3.76 feet/da = 1.3 E-03 cm/sec

* Reference: Bouwer, H and Rice, R.C., 1976: A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells: Water Res. Res. V.12. No. 3



Bouwer and Rice Slug Test Calculations *

Well MW-13 Case 6: Well Penetrates to the Aquifer Bottom

(Slug Out) K gravel pack >> K formation

Gravel Pack Drainage

Definition Of Variables:

D : Saturated Aquifer Thickness

H: Depth To the Bottom of the Gravel Pack minus the Static Depth to Water

L=H=D for Case 6

C: Well Geometry Factors - from Bouwer & Rice, Figure 3

rc : Inner Radius of the Well casing

rw : Radius of the Gravel Pack
Yo : Water Level Displacement at time = 0

t : Arbitrary Time from Recovery vs Time Plot
Yt : Water Level Displacement at time = t

Determined Values for Variables:

D = 12.99 feet

H = 12.99 feet , Notes:

L = 12.99 feet L = H = D

C = 2.5 L/rw = 38

B = 0.4

rw = 0.344 feet

rc = 0.0833 feet

Yo = 0.2 feet

t = 4.8 minutes

Yt = 0.01 feet

Calculations

 $(1/t)^{n}(Yo/Yt) = 0.62411$

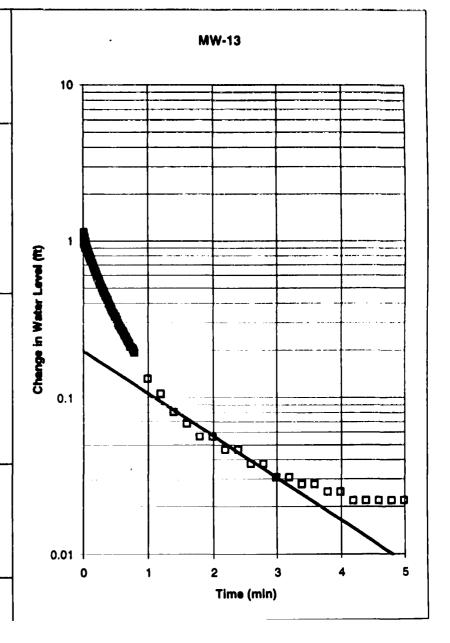
ln(Re/rw) = 1/[(1.1/ln(H/rw)+C/(L/rw)]

= 2.70909

K = [(rc*rc)+0.3*(rw*rw-rc*rc)]*ln(Re/rw)*(1/t)*ln(Yo/Yt))/(2L)

= 3.78 feet/da = 1.3 E-03 cm/sec

* Reference: Bouwer,H and Rice,R.C, 1976: A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells: Water Res. Res. V.12. No. 3



Appendix D Ground Water Sampling-Field Parameters

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GROUND WATER SAMPLING FIELD PARAMETERS GREINER'S LAGOON

WELL	DATE	pH (standard units) COND	SPECIFIC	TEMPERATURE (Fahrenheit)
NW:	7/2496	7.54	606	90.5
	_	7.26	576	59.4
		8.87	590	60.2
	11/10/96	7 51 7 52	550 550	58.6 58.7
		7.78	530	57 2
MW-2	7/23/96	7 56	635	57 5
		7 77	815	57.6
	11/10/96	7 56 10. 6 7	625 820	57 8
	11/10/30	10.87	780	60. 1
MM-3	7/24/96	6.77	404	58.7
1		7 95	396	57.6
		6.85	400	57.6
	11/10/96	9.20 9.11	980 580	58.1 58.1
		9 80	510	57.3
MM-4	7/22/96	7 35	1537	64.4
		7 :7	1542	61.2
	11/11/96	7.92 7.31	1581 2290	60.7 49.5
	11/11/20	6.90	2350	51.0
		6.91	2280	50.6
MW-5	7/23/96	0.54	1499	66.6
		8.48	1450 1476	64.9
	11/11/98	8.40 8.28	14/6	63.8 51.1
		8.21	594	51.1
		8 31	613	
MW-6	7/23/96	6 95	1896	67.4
		6.85 6.09	1745 174 9	66.9 8.80
	11/11/98	6.80	1609	52.0
		8.70	1647	53.7
		8.03	724	54.2
		8.04 7 86	712 653	54.4 54.8
MW-7	7/23/96	7.60	1898	62.5
		7 64	1842	62.7
		7.58	1799	62.4
	11/11/96	10 41	2650	\$3.4
		8.37 7 99	2080 1970	\$4.0 \$3.5
		7 70	1940	53.1
FW-4	7/22/96	8.74	2200	73.4
		8.54	2189	70.1
	11/11/96	0.42 7.20	2312 2010	70.2 50.6
	11/11/20	7.05	2010	50.5 50.5
		6.78	2020	52.0
W-9	11/11/90	6.56	968	48.6
		6.70	950	48.1
		6.91 6.96	932 924	51.2 50 .5
₽W-10	11/11/90	7.21	166	49.7
	_	7.06	181	50.9
		7 05	154	\$1.7
		7 01 7 01	156 161	\$2.5 \$2.1
£\$V-11	11/11/98	6.80		<u>52.3</u> 47.4
		6.05	607	44.6
		6,11	909	49.5
FW-12	11/11/96	8.34	1120	49.4
		6.37 6.43	1117 1155	48.5 49.2
W-13	11/11/96	7 61	796	49.5
-		7.60	791	48.0
		7 41	441	49.9
		7 48	378	52.7
TW-14	11/11/90	7 42 6.74	416 392	<u>51.7</u> 50.5
	11111177	6.64	.542 391	30.5 48.5
		6.86	156	49.6
		6.97	147	50.0
_		1 96	141	49.0

Appendix E
Stabilized Material/
Hydrogeologic Characterization
Sampling Analytical Results

Stabilized Material

Lubrizol Corporation
Greiner's Lagoon Site
Sandusky County, Ohio
Ground Water and Soil Samples
Collected 9 April
Through 12 April 1996
In Association with the
Engineering Evaluation/Cost Analysis
(EE/CA) Site Investigation

12 June 1996

Environmental Resources Management, Inc.

855 Springdale Drive Exton, Pennsylvania 19341

File No.: 09928.00.01

Lubrizol Corporation
Greiner's Lagoon Site
Sandusky County, Ohio

Ground Water and Soil Samples

Collected 9 April

Through 12 April 1996

In Association with the

Engineering Evaluation/Cost Analysis

(EE/CA) Site Investigation

12 June 1996

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TABLE OF CONTENTS

1.0	INT	RODUCI	TION	1
2.0	ORG	GANIC D	ATA	2
	2.1	ORGA	NIC DATA QUALIFIERS	2
•		2.1.1	Soil Organic Data Qualifiers	2
		2.1.2	Ground Water Organic Data Qualifiers	8
3.0	INO	RGANIC	DATA	10
	3.1	INOR	GANIC DATA QUALIFIERS	10
		3.1.1	Soil Organic Data Qualifiers	10
		3.1.2	Ground Water Organic Data Qualifiers	12
4.0	SUN	IMARY		14

ATTACHMENTS

- 1 METHODOLOGY SUMMARY/METHOD REFERENCES
- 2 DATA SUMMARY TABLES

LIST OF TABLES

1-1	Summary of Data Reviewed	following page 1
2-1	Samples Analyzed at Initial Dilutions and/or as	
	Medium Level Samples	following page 9

This analytical quality assurance report is based upon a review of analytical data generated for ground water and soil samples and associated quality control samples collected 9 April 1996 through 12 April 1996 at the Lubrizol Corporation, Greiner's Lagoon Site located in Sandusky County, Ohio as part of the Engineering Evaluation/Cost Analysis (EE/CA) Site Investigation. The analytical methods which were used in these analyses are summarized and referenced in Attachment 1. The sample locations, ERM control numbers, laboratory sample identification numbers, dates of collection, and analyses performed are presented on Table 1-1. Data summary tables presenting the validated and/or qualified analytical results are provided in Attachment 2.

The analytical data were reviewed for adherence to the specified analytical protocols. The reported results for organic and inorganic analyses have been validated or qualified using general guidance provided by "National Functional Guidelines for Organic (and Inorganic) Data Review", USEPA, 2/94 (and 2/94).

Table 1-1 Summary of Sample Data Reviewed Soil Samples

Sample Location	Laboratory ID Number	Date Sampled	Analyses Performed
GL-SS-SM-1 5'-7'	A6D110129 001	4/9/96	[1], [2]
GL-SS-SM-1 15'-17'	A6D110129 002	4/9/96	[1], [2]
GL-SS-SM-1 15'-17' DUP (Duplicate of GL-SS-SM-1 15'-17')	A6D110129 003	4/9/96	[1], [2]
GL-SS-SM-1 17'-19'	A6D110129 004	4/9/96	[1], [2]
GL-SS-SM-1 21'-23'	A6D110129 005	4/9/96	[1], [2]
GL-SS-SM-2 3'-5'	A6D120145 001	4/10/96	[1], [2]
GL-SS-SM-2 15'-17'	A6D120145 002	4/10/96	[1], [2]
GL-SS-SM-2 17'-19'	A6D120145 003	4/10/96	[1], [2]
GL-SS-SM-2 23'-25'	A6D120145 004	4/10/96	[1], [2]
GL-SS-SM-3 5'-7'	A6D130117 002	4/11/96	[1], [2]
GL-SS-SM-3 15'-17'	A6D130117 003	4/11/96	[1], [2]
GL-SS-SM-3 17'-19'	A6D130117 004	4/11/96	[1], [2]
GL-SS-SM-3 17'-19' DUP (Duplicate of GL-SS-SM-3 17'-19')	A6D130117 005	4/11/96	[1], [2]
GL-SS-SM-3 21'-23'	A6D130117 006	4/11/96	[1], [2]
GL-SS-SM-4 5'-7'	A6D130117 007	4/11/96	[1], [2]
GL-SS-SM-4 15'-17'	A6D130117 008	4/11/96	[1], [2]
GL-SS-SM-4 19'-21'	A6D130117 009	4/11/96	[1], [2]
GL-SS-SM-4 21'-23'	A6D130117 010	4/11/96	[1], [2]
GL-SS-SM-5 5'-7'	A6D120145 008	4/10/96	[1], [2]
GL-SS-SM-5 5'-7' DUP (Duplicate of GL-SS-SM-5 5'-7')	A6D120145 009	4/10/96	[1], [2]
GL-SS-SM-5 11'-13'	A6D120145 010	4/10/96	[1], [2]
GL-SS-SM-5 15'-17'	A6D120145 011	4/10/96	[1], [2]
GL-SS-SM-5 20'-22'	A6D120145 012	4/10/96	[1], [2]

^{[1] -} Target Compound List (TCL) Volatile Organic Compounds

^{[2] -} TCL Semivolatile Organic Compounds

^{[3] -} TCL Pesticide/PCBs

^{[4] -} Target Analyte List (TAL) Metals (Total)

^{[5] -} Priority Pollulant List (PPL) Metals

^{[6] -} Toxicity Characteristic Leaching Procedure (TCLP) List Metals

Table 1-1 Summary of Sample Data Reviewed (Continued)
Soil Samples

Sample Location	Laboratory ID Number	Date Sampled	Analyses Performed
GL-SS-SM-6 5'-7'	A6D120145 013	4/10/96	[1], [2]
GL-SS-SM-6 11'-13'	A6D120145 014	4/10/96	[1], [2]
GL-SS-SM-6 15'-17"	A6D120145 015	4/10/96	[1], [2]
GL-SS-SM-6 20'-22'	A6D120145 016	4/10/96	[1], [2]
GL-SS-SS 0'-1'	A6D120145 005	4/10/96	[1], [2], [3], [5], [6]
GL-SS-SM-7 3'-5'	A6D130117 014	4/11/96	[1], [2]
GL-SS-SM-77"-9"	A6D130117 015	4/11/96	[1], [2]
GL-SS-SM-7 11'-13'	A6D130117 016	4/11/96	[1], [2]
GL-SS-SM-7 11'-13' DUP (Duplicate of GL-SS-SM-7 11'-13')	A6D130117 017	4/11/96	[1], [2]
GL-SS-SM-7 15'-17"	A6D130117 026	4/12/96	[1], [2]
GL-SS-SM-8 0'-1'	A6D130117 001	4/11/96	[1], [2], [3], [5], [6]
GL-SS-SM-8 3'-5'	A6D130117 011	4/11/96	[1], [2]
GL-SS-SM-8 7"-9"	A6D130117 012	4/11/96	[1], [2]
GL-SS-SM-8 11'-13'	A6D130117 013	4/11/96	[1], [2]
GL-SS-SM-8 15'-17"	A6D130117 025	4/11/96	[1], [2]
GL-SS-SM-9 4'-6'	A6D130117 020	4/12/96	[1], [2]
GL-SS-SM-9 6'-8'	A6D130117 021	4/12/96	[1], [2]
GL-SS-SM-9 12'-14'	A6D130117 019	4/12/96	[1], [2]
GL-SS-SM-10 4'-6'	A6D130117 022	4/12/96	[1], [2]
GL-SS-SM-10 6-'8'	A6D130117 023	4/12/96	[1], [2]
GL-SS-SM-10 12'-14'	A6D130117 024	4/12/96	[1], [2]



^{[1] -} Target Compound List (TCL) Volatile Organic Compounds

^{[2] -} TCL Semivolatile Organic Compounds

^{[3] -} TCL Pesticide/PCBs

^{[4] -} Target Analyte List (TAL) Metals (Total)

^{[5] -} Priority Pollulant List (PPL) Metals

^{[6] -} Toxicity Characteristic Leaching Procedure (TCLP) List Metals

Table 1-1 Summary of Sample Data Reviewed (Continued) Soil Samples

Sample Location	Laboratory ID Number	Date Sampled	Analyses Performed
GL-SS-SM-1-4 5'-7'	A6D130117 035	4/12/96	[3], [5], [6]
GL-SS-SM-1-4 15'-17'	A6D130117 036	4/12/96	[3], [5], [6]
GL-SS-SM-1-4 17'-19'	A6D130117 034	4/12/96	[3], [5], [6]
GL-SS-SM-1-4 21'-23'	A6D130117 038	4/12/96	[3], [5], [6]
GL-SS-SM-5-6 5'-7'	A6D130117 037	4/12/96	[3], [5], [6]
GL-SS-SM-5-6 11'-13'	A6D130117 033	4/12/96	[3], [5], [6]
GL-SS-SM-5-6 15'-17'	A6D130117 039	4/12/96	[3], [5], [6]
GL-SS-SM-5-6 20'-22'	A6D130117 032	4/12/96	[3], [5], [6]
GL-SS-SM-7-8 3'-5'	A6D130117 031	4/12/96	[3], [5], [6]
GL-SS-SM-7-8 7'-9'	A6D130117 040	4/12/96	[3], [5], [6]
GL-SS-SM-7-8 15'-17'	A6D130117 030	4/12/96	[3], [5], [6]
GL-SS-SM-9-10 4'-6'	A6D130117 027	4/12/96	[3], [5], [6]
GL-SS-SM-9-10 6'-8'	A6D130117 028	4/12/96	[3], [5], [6]
GL-SS-SM-9-10 12'-14'	A6D130117 029	4/12/96	[3], [5], [6]

- [1] Target Compound List (TCL) Volatile Organic Compounds
- [2] TCL Semivolatile Organic Compounds
- [3] TCL Pesticide/PCBs
- [4] Target Analyte List (TAL) Metals (Total)
- [5] Priority Pollulant List (PPL) Metals
- [6] Toxicity Characteristic Leaching Procedure (TCLP) List Metals

Table 1-1 Summary of Sample Data Reviewed (Continued)
Aqueous Samples

Sample Location	Laboratory ID Number	Date Sampled	Analyses Performed
GL-WS-SM-1	A6D110129 007	4/9/96	[1], [2], [3], [4]
GL-WS-SM-1 DUP (Duplicate of GL-WS-SM-1)	A6D110129 008	4/9/96	[1], [2], [3], [4]
GL-WS-SM-4	A6D130117 046	4/11/96	[1], [2], [3], [5]
GL-WS-SM-8	A6D130117 047	4/11/96	[1], [2], [3], [5]
GL-WS-SM-9	A6D130117 044	4/12/96	[1], [2], [3], [5]
GL-WS-ER-101 (Equipment Blank)	A6D110129 006	4/9/96	[1], [2], [3], [4]
GL-WS-TB-201 (Trip Blank)	A6D110129 009	4/9/96	[1]
GL-WS-ER-101 (Equipment Blank)	A6D120145 006	4/10/96	[1], [2], [3], [5], [6]
GL-WS-ER-103 (Equipment Blank)	A6D130117 041	4/11/96	[1], [2], [3], [5]
GL-WS-ER-104 (Equipment Blank)	A6D130117 042	4/11/96	[1], [2], [3], [5]
GL-WS-TB-201 (Trip Blank)	A6D120145 007	4/10/96	[1]
GL-WS-TB-203 (Trip Blank)	A6D130117 018	4/11/96	[1]
GL-WS-TB-204 (Trip Blank)	A6D130117 043	4/11/96	[1]
GL-WS-TB-205 (Trip Blank)	A6D130117 045	4/12/96	[1]

- [1] Target Compound List (TCL) Volatile Organic Compounds
- [2] TCL Semivolatile Organic Compounds
- [3] TCL Pesticide/PCBs
- [4] Target Analyte List (TAL) Metals (Total)
- [5] Priority Pollulant List (PPL) Metals
- [6] Toxicity Characteristic Leaching Procedure (TCLP) List Metals

The organic analyses of the ground water and soil samples and their associated field quality control samples were performed by Quanterra Environmental Services of North Canton, Ohio. The samples were analyzed for Target Compound List (TCL) volatile organic compounds, semivolatile organic compounds and/or pesticide/PCBs, as indicated in Table 1-1. All sample analyses were performed according to the protocols specified in "Test Methods for Evaluating Solid Waste", SW-846, Third Edition, November 1986, updated July 1992. The methods used for these analyses are summarized and referenced in Attachment 1.

The findings offered in this report are based on a review of data generated according to a full data deliverables format for all samples. The following deliverables were evaluated for conformance with criteria: chain of custody documentation, holding times, laboratory method, equipment rinsate, and travel blank analysis results, surrogate compound recoveries, matrix spike compound recoveries and reproducibility, field duplicate analysis results, bromofluorobenzene (BFB) and decafluorotriphenylphosphine (DFTPP) mass tuning results, initial and continuing calibration summaries, and internal standard performance summaries.

The organic analyses were performed acceptably, but require qualifying statements. It is recommended that the reported analytical results be used only with the qualifying statements provided below. Any aspects of the data which are not discussed in this report should be considered qualitatively and quantitatively valid, as reported, based on the deliverables reviewed. Data summary tables presenting the validated and qualified results are provided in Attachment 2.

2.1 ORGANIC DATA QUALIFIERS

2.1.1 Soil Organic Data Qualifiers

• The positive results reported for volatile and semivolatile organic compounds in the samples listed below are considered qualitatively invalid due to the levels at which these compounds were present in the associated laboratory method, equipment rinsate, and/or travel blanks. USEPA protocol requires positive sample results for common laboratory contaminants, such as acetone, methylene chloride, and bis(2-ethylhexyl)phthalate, that are less than or equal to ten times the level found in associated blanks, to be considered qualitatively invalid. USEPA protocol also requires that positive results for

uncommon laboratory contaminants, such as 4-methyl-2-pentanone, toluene, and phenol, that are less than or equal to five times the level found in associated blanks, to also be considered qualitatively invalid. This has been indicated by placing "B" qualifiers next to the reported quantitative results for these compounds on the data summary tables.

Compounds	Qualitatively Invalid Sample Results
Acetone	GL-SS-SM-1 5'-7', GL-SS-SM-1 15'-17',
	GL-SS-SM-1 15'-17' DUP, GL-SS-SM-1 17'-19',
	GL-SS-SM-2 3'-5', GL-SS-SM-2 15'-17',
	GL-SS-SM-2 17'-19', GL-SS-SM-3 5'-7', GL-SS-SM-3 15'-17',
	GL-SS-SM-3 17'-19', GL-SS-SM-3 17'-19' DUP,
	GL-SS-SM-4 5'-7', GL-SS-SM-4 19'-21', GL-SS-SM-5 5'-7',
	GL-SS-SM-5 5'-7' DUP, GL-SS-SM-6 5'-7",
	GL-SS-SM-7 3'-5', GL-SS-SM-7 11'-13' DUP,
	GL-SS-SM-8 3'-5', GL-SS-SM-8 7'-9', GL-SS-SM-8 11'-13',
	GL-SS-SS 0'-1',
Methylene Chlonde	GL-SS-SM-4 21'-23', GL-SS-SM-6 15'-17',
·	GL-SS-SM-6 20'-22'
4-Methyl-2-pentanone	GL-SS-SM-3 21'-23', GL-SS-SM-4 15'-17',
	GL-SS-SM-7 11'-13'
bis(2-Ethylhexyl)phthalate	GL-SS-SM-5 20'-22'
Phenol	GL-SS-SM-4 5'-7', GL-SS-SM-4 19'-21', GL-SS-SM-8 7'-9'

- The samples listed on Table 2-1 were analyzed for volatile organic compounds, semivolatile organic compounds, and/or pesticide/PCB compounds at initial dilutions and/or according to medium-level sample preparation protocols because of suspected high levels of these compounds in the samples. The initial dilutions/medium-level protocols were required to prevent saturation of the instrument and to allow quantitation of the compounds within the linear range of the calibration curve. However, higher quantitation limits have resulted for specific volatile organic compounds, semivolatile organic compounds and/or pesticide/PCB compounds which were not detected in these samples. This should be noted when assessing these samples for the qualitative absence of specific volatile, semivolatile, and pesticide/PCB organic compounds.
- The soil samples presented below were re-analyzed at a dilutions and/or following medium level sample preparation protocols for volatile organic compounds or semivolatile organic compounds because the concentrations of target compounds detected in the initial

analyses exceeded the linear range of the instrument. The dilutions/medium level protocols were required to prevent saturation of the instrument and to allow quantitation of these compounds within the linear range of the calibration curve. Positive results for these compounds in these samples have been reported from the diluted analyses. All other results and quantitation limits for these samples have been reported from the initial analyses.

Sample	Compounds	Fraction	Dilution Factor
GL-SS-SM-1 21'-23'	Acetone, 4-Methyl-2-pentanone	VOAs	1X (Medium Level)
GL-SS-SM-6 15'-17'	Acetone	VOAs	1X (Medium Level)
GL-SS-SM-7 11'-13'	Acetone	VOAs	1X (Medium Level)
GL-SS-SM-7 15'-17'	Phenol, Bis(2-ethylhexyl)phthalate	SVOAs	2X
GL-SS-SM-8 11'-13'	Phenol, Bis(2-ethylhexyl)phthalate	SVOAs	20X
GL-SS-SM-8 15'-17'	Bis(2-ethylhexyl)phthalate	SVOAs	2X

• The positive results for acetone and 4-methyl-2-pentanone in the samples listed below should be considered quantitative estimates. Poor relative response factor (RRF) precision (>25% difference) between the initial calibration average response factor (RF) and the continuing calibration RRF associated with these samples was observed for these compounds. Poor continuing calibration RRF precision indicates a lack of instrument stability for these compounds in associated samples. The positive results for acetone and 4-methyl-2-pentanone in these samples should be considered quantitative estimates. This has been indicated by placing "J" qualifiers next to the positive results for these compounds in these samples on the data summary table.

Compounds	Samples Affected	
Acetone	GL-SS-SM-1 21'-23', GL-SS-SM-2 23'-25',	
	GL-SS-SM-5 15'-17"	
4-Methyl-2-Pentanone	GL-SS-SM-1 17'-19', GL-SS-SM-1 5'-7',	
•	GL-SS-SM-1 15'-17', GL-SS-SM-1 15'-17' DUP,	
	GL-SS-SM-2 3'-5', GL-SS-SM-2 15'-17',	
	GL-SS-SM-3 17'-19', GL-SS-SM-3 17'-19' DUP,	
	GL-SS-SM-5 5'-7' DUP, GL-SS-SM-7 3'-5',	
	GL-SS-SM-8 0'-1', GL-SS-SM-8 7'-9', GL-SS-SM-8 11'-13'	

- The positive results and/or quantitation limits for acid-extractable semivolatile organic compounds in sample GL-SS-SM-3 5'-7' should be considered biased low quantitative estimates and may be higher than reported. Low and/or no recovery was obtained for the acidextractable surrogate compounds, 2-fluorophenol and 2,4,6-tribromophenol for this sample. The low recoveries may be the result of extraction inefficiencies and/or matrix interferences present in this sample. Therefore, positive results and/or quantitation limits for acid-extractable semivolatile organic compounds in this sample should be considered biased low quantitative estimates. The sample was re-extracted and re-analyzed with similar results to confirm a matrix effect. The positive results and/or quantitation limits for acidextractable semivolatile organic compounds in this sample have been marked with "J" qualifiers on the data summary tables to indicate they are quantitative estimates. The elevated quantitation limits should be noted when assessing this sample for the qualitiative absence of acid-extractable semivolatile organic compounds
- The surrogate recoveries for the volatile organic compound analysis of soil samples GL-SS-SM-5 5'-7' DUP, and GL-SS-SM-8 3'-5' could not be evaluated due to necessary sample dilutions. The dilutions were required because high levels of target and/or non-target compounds present in the sample prevented the identification and quantification of specific volatile organic compounds within the instrument's linear range. However, these dilutions have resulted in no and/or low surrogate recoveries. Therefore, ERM was not able to evaluate the volatile organic analysis data for these samples based on surrogate recoveries. This should be noted when assessing these samples for volatile organic compounds.
- The surrogate recoveries for the semivolatile organic compound analysis of soil samples GL-SS-SM-1 5'-7' DUP, GL-SS-SM-1 15'-17' DUP, GL-SS-SM-2 3'-5', GL-SS-SM-5 5'-7', GL-SS-SM-5 5'-7' DUP, GL-SS-SM-5 11'-13', GL-SS-SM-6 5'-7', GL-SS-SM-6 11'-13', GL-SS-SS 0'-1', GL-SS-SM-4 19'-21', GL-SS-SM-8 3'-5',

GL-SS-SM-7 3'-5', GL-SS-SM-7'-9', GL-SS-SM-8 0'-1', GL-SS-SM-3 15'-17', GL-SS-SM-3 17'-19', GL-SS-SM-17'-19' DUP, GL-SS-SM-4 5'-7', and GL-SS-SM-8 7'-9' could not be evaluated due to necessary sample dilutions. The dilutions were required because high levels of target and/or non-target compounds present in the sample prevented the identification and quantification of specific semivolatile organic compounds within the instrument's linear range. However, these dilutions have resulted in no and/or low surrogate recoveries. Therefore, ERM was not able to evaluate the semivolatile organic analysis data for these samples based on surrogate recoveries. This should be noted when assessing these samples for semivolatile organic compounds.

- The surrogate recoveries for the pesticide/PCB compound analysis of soil samples GL-SS-SM-1-4 15'-17', GL-SS-SM-5-6 5'-7', GL-SS-SM-7-8 3'-5', GL-SS-SM-7-8 7'-9', and GL-SS-SM-8 0'-1' could not be evaluated due to necessary sample dilutions. The dilutions were required because high levels of target and/or non-target compounds present in the sample prevented the adequate resolution and identification of specific pesticide/PCB compounds. However, these dilutions have resulted in no and/or low surrogate recoveries. Therefore, ERM was not able to evaluate the pesticide/PCB analysis data for these samples based on surrogate recoveries. This should be noted when assessing these samples for pesticide/PCB compounds.
- Sample GL-SS-SM-1 15'-17' and its blind duplicate sample, GL-SS-SM-1 15'-17' DUP were submitted to the laboratory to evaluate sampling and analytical precision for those compounds determined to be confidently detected. All compounds met ERM's blind duplicate precision criteria of 30% relative percent difference (RPD) for volatile organic compounds and 40% RPD for semivolatile organic compounds. The RPD was not calculated for the compounds that were detected in one sample at a concentrations less than the quantitation limit but were not detected in the other sample.
- Sample GL-SS-SM-5 5'-7' and its blind duplicate sample, GL-SS-SM-5 5'-7' DUP were submitted to the laboratory to evaluate sampling and analytical precision for those compounds determined to be confidently detected. All compounds met ERM's blind duplicate precision criteria of 30% relative percent difference (RPD) for volatile organic compounds and 40% RPD for semivolatile organic compounds, ethylbenzene, 4-methyl-2-pentanone, toluene, and xylenes and the semivolatile organic compound, 2-methylnaphthalene. The RPD was not calculated for the compounds that were detected in one sample at a concentrations less than the quantitation limit but were not detected in the other sample.

The lack of precision for ethylbenzene, 4-methyl-2-pentanone, toluene, xylenes(total), and 2-methylnaphthalene may be due to the heterogeneity of the duplicate samples. This lack of precision is anticipated, however, as the results approach the limit of detection. The positive results for these compounds should be considered quantitative estimates. This has been indicated by placing "J" qualifier next to the positive results for these compounds in these samples on the data summary tables.

Sample GL-SS-SM-7 11'-13' and its blind duplicate sample, GL-SS-SM-7 11'-13' DUP were submitted to the laboratory to evaluate sampling and analytical precision for those compounds determined to be confidently detected. All compounds met ERM's blind duplicate precision criteria of 30% relative percent difference (RPD) for volatile organic compounds and 40% RPD for semivolatile organic compounds, acetone and 4-methyl-2-pentanone and the semivolatile organic compound, phenol. The RPD was not calculated for the compounds that were detected in one sample at a concentrations less than the quantitation limit but were not detected in the other sample.

The lack of precision for acetone, 4-methyl-2-pentanone, and phenol may be due to the heterogeneity of the duplicate samples. This lack of precision is anticipated, however, as the results approach the limit of detection. The positive results for these compounds should be considered quantitative estimates. This has been indicated by placing a "J" qualifier next to the reported positive results on the data summary tables.

Sample GL-SS-SM-3 17'-19' and its blind duplicate sample, GL-SS-SM-3 17'-19' DUP were submitted to the laboratory to evaluate sampling and analytical precision for those compounds determined to be confidently detected. All compounds met ERM's blind duplicate precision criteria of 30% relative percent difference (RPD) for volatile organic compounds and 40% RPD for semivolatile organic compounds, benzene, ethylbenzene, and xylenes and the semivolatile organic compound, bis(2-ethylhexyl)phthalate. The RPD was not calculated for the compounds that were detected in one sample at a concentrations less than the quantitation limit but were not detected in the other sample.

The lack of precision for benzene, ethylbenzene, xylenes and bis(2-ethylhexyl)phthalate may be due to the heterogeneity of the duplicate samples. This lack of precision is anticipated, however, as the results approach the limit of detection. The positive results for these compounds should be considered quantitative estimates. This

has been indicated by placing a "J" qualifier next to the reported positive results on the data summary tables.

2.1.2 Ground Water Organic Data Qualifiers

- The positive results reported for the volatile organic compounds, acetone in sample GL-WS-SM-9 and toluene in samples GL-WS-SM-1 and GL-WS-SM-1 DUP are considered qualitatively invalid due to the levels at which these compounds were present in the associated laboratory method, equipment rinsate, and/or travel blanks. USEPA protocol requires positive sample results for common laboratory contaminants, such as acetone, that are less than or equal to ten times the level found in associated blanks, to be considered qualitatively invalid. USEPA protocol also requires that positive results for uncommon laboratory contaminants, such as toluene that are less than or equal to five times the level found in associated blanks, to also be considered qualitatively invalid. This has been indicated by placing "B" qualifiers next to the reported quantitative results for these compounds in these samples on the data summary tables.
- The surrogate recoveries for the semivolatile organic compound analysis in ground water samples GL-WS-SM-1, GL-WS-SM-1 DUP, GL-WS-SM-4, GL-WS-SM-8, GL-WS-SM-9 could not be evaluated due to necessary sample dilutions. The dilutions were required because high levels of target and/or non-target compounds present in the sample prevented the identification of and quantitation of specific semivolatile organic compounds within the linear calibration range of the instrument. However, these dilutions have resulted in poor recoveries. Therefore, ERM was not able to evaluate the semivolatile organic compound analysis data for these samples based on surrogate recoveries. This should be noted when assessing the these samples for semivolatile organic compounds.
- The ground water samples listed on Page 9 were analyzed for volatile and semivolatile organic compounds and pesticide/PCB compounds at initial dilutions because of suspected high levels of target and non-target compounds. The initial dilutions were required to prevent saturation of the instrument, to improve chromatographic resolution, and to allow the quantitation of the compounds within the linear range of the calibration curve. However, higher quantitation limits have resulted for specific target compounds which were not detected in these samples. These higher quantitation limits should be noted when assessing these samples for the qualitative absence of specific volatile and semivolatile organic compounds and pesticide/PCB compounds in these ground water samples.

Sample	Fraction	Dilution Factor
GL-WS-SM-1	VOAs	1000X
	SVOAs	1180X
	Pesticide / PCBs	1190X
GL-WS-SM-1 DLP	VOAs	500X
	SVOAs	980X
	Pesticide/PCBs	1190X
GL-WS-SM-4	VOAs	830X
	SVOAs	50X
	Pesticide/PCBs	530X
GL-WS-SM-8	VOAs	1250X
	SVOAs	8000X
	Pesticide/PCBs	5620X
GL-WS-SM-9	SVOAs	20X
	Pesticide/PCBs	130X

- The surrogate recoveries for the pesticide/PCB compound analysis of samples GL-WS-SM-1, GL-WS-SM-1 DUP, GL-WS-SM-4, GL-WS-SM-8, and GL-WS-SM-9 could not be evaluated due to necessary sample dilutions. The dilutions were required because high levels of target and/or non-target compounds present in the sample prevented the adequate resolution and identification of specific semivolatile organic compounds. However, these dilutions have resulted in poor recoveries. Therefore, ERM was not able to evaluate the pesticide/PCB compound analysis data for these samples based on surrogate recoveries. This should be noted when assessing the these samples for pesticide/PCB compound.
- Sample GL-WS-SM-1 and its blind duplicate sample, GL-WS-SM-1 DUP were submitted to the laboratory to evaluate sampling and analytical precision for those compounds determined to be confidently detected. All compounds met ERM's blind duplicate precision criteria of 20% relative percent difference (RPD) for volatile organic compounds and 25% RPD for semivolatile and pesticide/PCB compounds. The RPD was not calculated for the compounds that were detected in one sample at a concentrations less than the quantitation limit but were not detected in the other sample.

Table 2-1 Samples Analyzed at Initial Dilutions and/or as Medium Level Samples

Sample	Fraction	Dilution Factor
GL-SS-SM-1 5'-7'	VOAs SVOAs	1X (Medium Level) 10X
GL-SS-SM-1 15'-17'	VOAs SVOAs	1X (Medium Level) 4X
GL-SS-SM-1 15'-17' DUP	. VOAs SVOAs	1X (Medium Level) 10X
GL-SS-SM-1 17'-19'	VOAs	1X (Medium Level)
GL-SS-SM-1 21'-23'	VOAs	10X
GL-SS-SM-1-4 5'-7'	Pest/PCBs	10X
GL-SS-SM-1-4 15'-17'	Pest/PCBs	200X
GL-SS-SM-1-4 17'-19'	Pest/PCBs	10X
GL-SS-SM-1-4 21'-23'	Pest/PCBs	5X
GL-SS-SM-2 3'-5'	VOAs	1X (Medium Level)
	SVOAs	200X
GL-SS-SM-2 15'-17'	VOAs	1X (Medium Level)
	SVOAs	2.5X
GL-SS-SM-2 17'-19'	VOAs	2.9X (Medium Level)
	SVOAs	4X
GL-SS-SM-2 23'-25'	VOAs	1X (Medium Level)
GL-SS-SM-3 5'-7'	VOAs	1X (Medium Level)
	SVOAs	2X
GL-SS-SM-3 15'-17'	VOAs	5X (Medium Level)
	SVOAs	120X
GL-SS-SM-3 17'-19'	VOAs	5X (Medium Level)
	SVOAs	40X

Table 2-1 Sample sAnalyzed at Initial Dilutions and/or as Medium Level Samples (Continued)

Sample	Fraction	Dilution Factor
GL-SS-SM-3 17"-19" DUP	VOAs	1X (Medium Level)
	SVOAs	25X
GL-SS-SM-4 5'-7"	VOAs	10X (Medium Level)
	SVOAs	600X
GL-SS-SM-4 15'-17'	VOAs	1X (Medium Level)
	SVOAs	4X
GL-SS-SM-4 19'-21'	VOAs	1X (Medium Level)
	SVOAs	5X
GL-SS-SM-4 21'-23'	VOAs	2X
GL-SS-SM-5 5'-7"	VOAs	5X (Medium Level)
	SVOAs	80X
GL-SS-SM-5 5'-7" DUP	VOAs	20X (Medium Level)
	SVOAs	200X
GL-SS-SM-5 11'-13'	VOAs	3.3X (Medium Level)
	SVOAs	33X
GL-SS-SM-5 15'-17"	VOAs	1X (Medium Level)
GL-SS-SM-5 20'-22'	VOAs	5X
GL-SS-SM-5-6 5'-7"	Pest/PCBs	200X
GL-SS-SM-5-6 11'-13'	Pest/PCBs	10X
GL-SS-SM-5-6 15'-17'	Pest/PCBs	10X
GL-SS-SM-5-6 20'-22'	Pest/PCBs	5X
GL-SS-SM-6 5'-7'	VOAs	1X (Medium Level)
	SVOAs	33X
GL-SS-SM-6 11'-13'	VOAs	1X (Medium Level)
	SVOAs	33X

Table 2-1 Sample sAnalyzed at Initial Dilutions and/or as Medium Level Samples (Continued)

Sample	Fraction	Dilution Factor
GL-SS-SM-6 15'-17'	VOAs	10X
	SVOAs	4X
GL-SS-SM-6 20'-22'	VOAs	10X
GL-SS-SM-7 3'-5'	VOAs	2X (Medium Level)
	SVOAs	400X
GL-SS-SM-7 7'-9'	VOAs	1X (Medium Level)
	SVOAs	20X
GL-SS-SM-7 11'-13' DUP	SVOAs	2X
GL-SS-SM-7 11'-13'	VOAs	10X
GL-SS-SM-7 15'-17'	VOAs	3.3X
GL-SS-SM-7-8 3'-5'	Pest/PCBs	200X
GL-SS-SM-7-8 7'-9'	Pest/PCBs	200X
GL-SS-SM-7-8 15'-17'	Pest/PCBs	10X
GL-SS-SM-8 0'-1'	VOAs	20X (Medium Level)
	SVOAs	1400X
	Pest/PCBs	1000X
GL-SS-SM-8 3'-5'	VOAs	20X (Medium Level)
	SVOAs	1000X
GL-SS-SM-8 7'-9'	VOAs	5X (Medium Level)
	SVOAs	1000X
GL-SS-SM-8 11'-13'	VOAs	2X (Medium Level)
GL-SS-SM-8 15'-17'	VOAs	. 1.7X
GL-SS-SM-9-10 6'-8'	Pest/PCBs	10X
GL-SS-SM-9-10 12'-14'	Pest/PCBs	5X
GL-SS-SS 0'-1'	VOAs	1.7X (Medium Level)
	SVOAs	400X
	Pesticide/PCBs	1000X

The inorganic analyses of the ground water and soil samples and their associated field quality control samples were performed by Quanterra Environmental Services of North Canton, Ohio. These samples were analyzed for Target Analyte List (TAL) metals or Priority Pollutant List (PPL) metals. In addition, several samples were taken through the Toxicity Characteristic Leaching Procedure (TCLP) and the resulting leachate was analyzed for TCLP List metals, as indicated in Table 1-1. The leaching procedure and all sample analyses were performed according to the protocols specified in "Test Methods for Evaluating Solid Waste", SW-846, Third Edition, November 1986, updated July 1992. The methods used for these analyses are summarized and referenced in Attachment 1.

The findings in this report are based on a review of the data generated according to a full data deliverables format. The following deliverables were evaluated for conformance with criteria: chain of custody documentation, holding times, laboratory method blank results, matrix spike recoveries, laboratory and field duplicate analysis results, detection limits/sensitivity, initial and continuing calibrations, laboratory control sample results, Inductively Coupled Plasma (ICP) Emission Spectroscopy, interference check sample results, ICP serial dilution results, Graphite Furnace Atomic Absorption (GFAA) Spectroscopy post-digestion spike recoveries, and standard addition results.

The inorganic analyses were performed acceptably, but require qualifying statements. It is recommended that the analytical results by used only with the qualifying statements presented below. Any aspects of the data which are not discussed in this report should be considered qualitatively and quantitatively valid, as reported, based on the deliverables reviewed. Data summary tables presenting the validated and qualified results are provided in Attachment 2.

3.1 INORGANIC DATA QUALIFIERS

3.1.1 Soil Inorganic Data Qualifiers

The positive results and/or detection limits reported for selenium in samples, GL-SS-SM-1-4 5'-7', GL-SS-SM-1-4 15'-17', GL-SS-SM-1-4 17'-19', GL-SS-SM-5-6 5'-7', GL-SS-SM-5-6 11'-13', GL-SS-SM-5-6 20'-22', GL-SS-SM-7-8 3'-5', GL-SS-SM-7-8 7'-9', GL-SS-SM-7-8 15'-17', GL-SS-SM-9-10 6'-8', and GL-SS-SM-9-10 12'-14' should be considered biased low quantitative estimates due to

negative results reported in laboratory blanks. The negative blanks indicate the probability of underestimation of the analyte concentration by the instrument. The positive results and/or detection limits for selenium have been marked with "J" qualifiers on the data summary tables to indicate that they are biased low quantitative estimates. The possibility of elevated detection limits should be noted when assessing the data for the qualitative absence of selenium in these samples.

- The positive result for selenium in the soil sample GL-SS-SS 0'-1' should be considered a biased low quantitative estimate and may be higher than reported. The GFAA post-digestion spike recovery for selenium in this sample was below the established quality control (QC) limit. The positive result has been qualified by placing a "J" qualifier next to the reported quantitative results.
- The positive results and/or detection limits reported for antimony, beryllium, copper, lead, nickel, selenium, thallium, and zinc in the samples listed on page 12 should be considered biased low quantitative estimates and may be higher than reported. The associated matrix spike recoveries were below the established quality control (QC) limit for these analytes. The low recoveries indicate the presence of matrix interferences in samples of a similar matrix. This has been indicated by placing "J" qualifiers next to the positive results and/or detection limits for these analytes on the data summary tables for these samples. The possibility of elevated detection limits should be noted when assessing the data for the qualitative absence of antimony, beryllium, copper, lead, nickel, selenium, thallium, and zinc in these samples.

Analyte	Samples Affected
Antimony	GL-SS-SM-1-4 5-7, GL-SS-SM-1-4 15-17, GL-SS-SM-1-4 17-19', GL-SS-SM-1-4 21-23', GL-SS-SM-5-6 5'-7, GL-SS-SM-5-6 11'-13', GL-SS-SM-5-6 15'-17', GL-SS-SM-5-6 20'-22', GL-SS-SM-7-8 3'-5', GL-SS-SM-7-8 7'-9', GL-SS-SM-7-8 15'-17', GL-SS-SM-8 0'-1', GL-SS-SM-9-10 4'-6', GL-SS-SM-9-10 6'-8', GL-SS-SM-9-10 12'-14'
Beryllium	GL-SS-SM-1-4 5-7, GL-SS-SM-1-4 15'-17, GL-SS-SM-1-4 17'-19', GL-SS-SM-1-4 21'-23', GL-SS-SM-5-6 5'-7, GL-SS-SM-5-6 11'-13', GL-SS-SM-5-6 15'-17, GL-SS-SM-5-6 20'-22', GL-SS-SM-7-8 3'-5', GL-SS-SM-7-8 7'-9', GL-SS-SM-7-8 15'-17, GL-SS-SM-9-10 4'-6', GL-SS-SM-9-10 6'-8', GL-SS-SM-9-10 12'-14'
Co pper	GL-SS-SM-1-4 5-7, GL-SS-SM-1-4 15-17, GL-SS-SM-1-4 17-19', GL-SS-SM-1-4 21'-23', GL-SS-SM-5-6 5'-7, GL-SS-SM-5-6 11'-13', GL-SS-SM-5-6 15'-17', GL-SS-SM-5-6 20'-22', GL-SS-SM-7-8 3'-5', GL-SS-SM-7-8 7-9', GL-SS-SM-7-8 15'-17', GL-SS-SM-8 0'-1', GL-SS-SM-9-10 4'-6', GL-SS-SM-9-10 6'-8', GL-SS-SM-9-10 12'-14'
Lead	GL-SS-SM-1-4 5'-7, GL-SS-SM-1-4 15'-17, GL-SS-SM-1-4 17'-19', GL-SS-SM-1-4 21'-23', GL-SS-SM-5-6 5'-7, GL-SS-SM-5-6 11'-13', GL-SS-SM-5-6 15'-17, GL-SS-SM-5-6 20'-22', GL-SS-SM-7-8 3'-5', GL-SS-SM-7-8 7'-9', GL-SS-SM-7-8 15'-17, GL-SS-SM-8 0'-1', GL-SS-SM-9-10 4'-6', GL-SS-SM-9-10 6'-8', GL-SS-SM-9-10 12'-14'
Nickel	GL-SS-SM-1-4 5'-7, GL-SS-SM-1-4 15'-17, GL-SS-SM-1-4 17'-19', GL-SS-SM-1-4 21'-23', GL-SS-SM-5-6 5'-7, GL-SS-SM-5-6 11'-13', GL-SS-SM-5-6 15'-17, GL-SS-SM-5-6 20'-22', GL-SS-SM-7-8 3'-5', GL-SS-SM-7-8 7'-9', GL-SS-SM-7-8 15'-17', GL-SS-SM-8 0'-1', GL-SS-SM-9-10 4'-6', GL-SS-SM-9-10 6'-8', GL-SS-SM-9-10 12'-14'
Selenium	GL-SS-SM-1-4 21'-23', GL-SS-SM-5-6 15'-17', GL-SS-SM-8 0'-1', GL-SS-SM-9-10 4'-6'
Thallium	GL-SS-SM-1-4 5'-7, GL-SS-SM-1-4 15'-17, GL-SS-SM-1-4 17-19', GL-SS-SM-1-4 21'-23', GL-SS-SM-5-6 5'-7, GL-SS-SM-5-6 11'-13', GL-SS-SM-5-6 15'-17, GL-SS-SM-5-6 20'-22', GL-SS-SM-7-8 3'-5', GL-SS-SM-7-8 7'-9', GL-SS-SM-7-8 15'-17, GL-SS-SM-8 0'-1', GL-SS-SM-9-10 4'-6', GL-SS-SM-9-10 6'-8', GL-SS-SM-9-10 12'-14'
Zinc	GL-SS-SM-1-4 5'-7, GL-SS-SM-1-4 15'-17, GL-SS-SM-1-4 17'-19', GL-SS-SM-1-4 21'-23', GL-SS-SM-5-6 5'-7, GL-SS-SM-5-6 11'-13', GL-SS-SM-5-6 15'-17, GL-SS-SM-5-6 20'-22', GL-SS-SM-7-8 3'-5', GL-SS-SM-7-8 7'-9', GL-SS-SM-7-8 15'-17', GL-SS-SM-8 0'-1', GL-SS-SM-9-10 4'-6', GL-SS-SM-9-10 6'-8', GL-SS-SM-9-10 12'-14'

3.1.2 Ground Water Inorganic Data Qualifiers

• The detection limits reported for selenium in samples GL-WS-SM-4, GL-WS-SM-8, and GL-WS-SM-9 should be considered biased low quantitative estimates and may be higher than reported. The GFAA post digestion spike recoveries were below the established quality

- control (QC) limit for this analyte in these samples. The low recoveries indicate the presence of matrix interferences in these samples. This has been indicated by placing "J" qualifiers next to the detection limits for selenium on the data summary tables for these samples. The possibility of elevated detection limits should be noted when assessing the data for the qualitative absence of selenium in these samples.
- The reported positive results and/or detection limits for copper in the samples GL-WS-SM-1 and GL-WS-SM-1 DUP should be considered biased high quantitative estimates and may be higher than reported. The associated matrix spike recoveries were above the established quality control (QC) limit for this analyte. The high recoveries indicate the presence of matrix interferences in samples of a similar matrix. This has been indicated by placing "J" qualifiers next to the positive results and/or detection limits for copper on the data summary tables.
- The reported positive results and/or detection limits for antimony, arsenic, beryllium, cadmium, cobalt, mercury, nickel, selenium, thallium, and vanadium in samples GL-WS-SM-1, and GL-SW-SM-1 DUP should be considered biased high quantitative estimates and may be higher than reported. The associated matrix spike recoveries were above the established quality control (QC) limit for these analytes. The high recoveries indicate the presence of matrix interferences in samples of a similar matrix. This has been indicated by placing "J" qualifiers next to the positive results and/or detection limits for antimony, arsenic, beryllium, cadmium, cobalt, mercury, nickel, selenium, thallium, and vanadium on the data summary tables.
- Sample GL-WS-SM-1 and its blind duplicate sample, GL-WS-SM-1 DUP were submitted to the laboratory to evaluate sampling and analytical precision for those compounds determined to be confidently detected. All compounds met ERM's blind duplicate precision criteria of 25% relative percent difference (RPD) for metals. The RPD was not calculated for the compounds that were detected in one sample but were not detected in the other sample.

4.0 SUMMARY

The organic and inorganic analyses were performed acceptably, but required a few qualifying statements. This analytical quality assurance report has identified the aspects of the data which required qualification. A support documentation package has been prepared for this quality assurance review and is located with the Lubrizol Corporation project file.

Attachment 1 Analysis Method References and Summaries

ATTACHMENT 1 METHODOLOGY SUMMARY AND METHOD REFERENCES

METHODOLOGY SUMMARY

Analysis for Volatile Organic Compounds by GCIMS

The samples were analyzed for volatile organic compounds by adding 5 milliliter (mL) water or 5 gram aliquots to 5 mL reagent water containing surrogate compounds and internal standards and purging the mixture with helium at ambient temperature. The volatile compounds were transferred from the aqueous phase to the vapor phase and trapped onto a sorbent column. After purging, the column was heated and back-flushed to desorb the compounds onto a gas chromatographic column. The gas chromatograph was temperature programmed to separate the sample components, which were then detected by a mass spectrometer. The target compounds were qualitatively identified and quantitated through calibration with standards.

Analysis for Semivolatile Organic Compounds by GCIMS

Aqueous sample aliquots are acidified to pH 2 and extracted with 1:1 methylene chloride using a continuous liquid-liquid extractor. Thirty grams of soil sample are extracted with 1:1 methylene chloride using a sonicator. The methylene chloride extract is dried and concentrated to a final volume of 1 ml. The extract is decanted and filtered. The extract is then analyzed by first separating the extract components using a gas chromatographic column and then detecting them with a mass spectrometer for qualitative and quantitative evaluation.

Analysis for Pesticides/PCBs

Thirty grams (wet weight) of the soil or 1,000 mL of water sample are extracted with 1:1 methylene chloride and acetone by sonic disruption. The extract is decanted and filtered. The extraction is repeated two or more times, decanting after each sonication. The extract is then concentrated and analyzed by first separating the extract components using a gas chromatographic column and then detecting them with an electron capture detector (ECD).

Florisil cleanup is performed on the chromatographic column prior to the sample analysis.

Analysis for ICP Metals

Prior to analysis, 100- milliliter or one gram sample aliquots were digested with nitric and hydrochloric acids for aqueous analysis. The solution resulting from the metals digestion was analyzed by Inductively Coupled Plasma (ICP) Emission Spectroscopy.

Analysis for Antimony, Arsenic, Selenium, and Lead

One hundred- milliliter sample or one gram sample aliquots were digested with nitric and hydrogen peroxide for aqueous analysis. The resulting solutions were analyzed by graphite furnace atomic absorption (GFAA).

Analysis for Mercury

Aqueous and solid samples analyzed for mercury were oxidized with potassium permanganate. Mercury was reduced to its elemental form and aerated from solution in a closed system. Mercury was then determined with a cold vapor atomic absorption spectrophotometer.

Analysis for TCLP Inorganics (ICP and Cold Vapor AA)

The leachate samples were extracted according to USEPA SW-846-1311. This procedure requires extraction using one of two fluids based on the alkalinity of the sample. The sample is then extracted for 18 hours in a rotary agitation device at room temperature and filtered through a 0.6 to 0.8 µm glass fiber filter. The resulting leachate is analyzed as an aqueous sample. Inductively coupled plasma (ICP) atomic emission by USEPA Method SW-846-6010 was used for the analysis of the TCLP extracts for the following analytes: arsenic, barium, cadmium, chromium, lead, selenium and silver. The TCLP extracts were analyzed for mercury using USEPA Method SW-846-7470 (cold vapor atomic absorption spectrometry). TCLP metals were performed using Method 6010, and TCLP mercury by Method 7470.

METHOD REFERENCES

Analysis	References
Volatile Organic Compounds	Test Methods for Evaluating Solid Wastes, SW-846, 3rd Edition, (USEPA 1986), Method 8240A.
Semivolatile Organic Compounds	Test Methods for Evaluating Solid Wastes, SW-846, 3rd Edition. (USEPA 1986), Method 8270A.
Organochlorine Pesticide/PCBs	Test Methods for Evaluating Solid Wastes, SW-846, 3rd Edition, (USEPA 1986), Method 8080.
TCL and PPL Metals	Test Methods for Evaluating Solid Wastes, SW-846, 3rd Edition, (USEPA 1986, updated July 1992), Methods 6010A, 7060, 7071, 7421, 7470, 7740, and 7841.
TCLP extraction, TCLP analysis	Test Methods for the Evaluation of Solid Wastes, USEPA SW-846, Methods 6010, 7060, 7470

Attachment 2 Data Summary Tables

Target Compound List¹v le Organic Compounds Soil Analytical Results The Lubrizol Corporation Greiner's Lagoon Bite Sandusky County, Ohio

SAMPLE LOCATION:	1	GI SS SI	41	GL SS-S	MI	GL 88-8MI	DUP	CI. 98-9	MI	GL:SS-SI	vii i	(i) 56-SI	VI 2	CIL-SS-SA	M-2
DEPTH:	i i	5.7		15-17	•	15:17		17-19	•	217-237		3.5		15/47	•
DATE COLLECTED:	İ	4/9/9	•	4/9/9	b	4/9/9	.	4/9/9	•	4/9/94		4/10/9	16	4/10/9	No.
MOISTURE CONTENT:	Ī	30.3		18.3		192		18.5		20 1		164		16.6	
MATRIX:		SOLIL)	SOLIL)	SOLI	,	SOLIO)	SOLID	,	SOLID)	SOLID)
ANALYTE	UNITS			1		1				1				· · · · · · · · · · · · · · · · · · ·	
Chloromethane	ug/kg	1800	U	1500	U	1500	U	1500	U	130	u	1500	U	1500	บ
Bromomethane	ug/kg	1800	U	1500	u	1500	u	1500	U	130	U	1500	U	1500	u
Vinyt chloride	ug/kg	1800	U	1500	u	1500	บ	1500	u	130	U	1500	U	1500	U
Chloroethane	ug/kg	1800	U	1500	U	1500	U	1500	U	130	U	1500	Ð	1500	U
Methylene chloride	ug/kg	900	U	770	U	770	U	770	U	29	J	750	U	750	U
Acetone	ug/kg	2200	B	1800	19	1700	В	720	8	6800	J	1100	8	5600	В
Carbon disultide	ug/kg	400	13	770	U	770	U	770	U	63	U	790	U	750	U
1.1-Dichlorowthene	ug/hg	900	IJ	770	U	770	U	<i>77</i> 0	U	63	u	750	U	750	U
1.1 Dichloruethane	ug/kg	900	U	770	U	770	U	<i>77</i> 0	U	63	U	750	U	750	U
1,2 Dichloroethene (total)	ug/hg	900	U	770	U	770	U	770	U	63	U	750	U	750	U
Chloroform	ug/kg	900	U	770	U	770	U	770	U	63	U	750	U	7%)	U
1,2-Dichloroethane	ug/kg	900	U	770	U	770	U	770	U	6.3	U	750	U	750	U
2 Butanone	ug/kg	410	J	3100	U	3100	U	3100	U	290		3000	U	1100	J
1,1,1-Trichlorowthane	ug/kg	900	U	770	U	770	U	770	U	63	U	750	U	750	U
Carbon tetrachloride	ug/kg	900	IJ	770	ti	770	U	770	υ	63	U	750	U	750	U
Bromodichloromethane	ug/kg	900	IJ	770	U	770	บ	77 0	U	63	U	750	U	750	U
1,2 Dichloropropane	ug/kg	900	U	770	υ	770	U	770	U	6.3	U	750	t)	750	U
cis 1,3 Dichloropropene	ug/kg	900	U	770	U	770	U	<i>77</i> 0	Ų	63	U	750	()	750	U
Trichloroethene	ug/kg	900	U	490	J	770	υ	770	U	63	U	750	U	750	U
Dibromochloromethane	ug/kg	900	U	770	U	770	U	<i>77</i> 0	U	63	U	750	t1	750	U
1,1,2-Trichloroethane	ug/kg	900	U	770	U	770	U	770	U	63	U	750	U	750	U
Benzene	ug/kg	860)	3200		1300		770	U	160		350	J	390	1
trans-1,3-Dichloropropene	ug/kg	900	U	770	υ	770	U	<i>7</i> 70	U	63	υ	750	U	750	U
Bromoform	ug/kg	900	U	770	U	770	U	770	U	63	U	750	U	750	U
4 Methyl 2 pentanone	ug/kg	8700	j	16000	1	12000	J	14000	J	2100	1	6800	J	23000	1
2-1 fexanone	ug/kg	3600	U	3100	U	3100	U	3100	U	250	U	3000	U	3000	U
Tetrachloroethene	ug/kg	900	U ·	770	υ	770	U	770	U	6.3	U	750	U	750	U
1,1,2,2-Tetrachloroethane	ugs/kg	470	1	770	U	770	U	770	U	63	U	750	U	750	U
Toluene	ug/kg	12000		7600		3200		900		310		11000		12000	
Chlorobenzene	ug/kg	900	U	770	U	770	U	770	U	6.7	U	750	U	750	U
Ethylbenzene	ug/kg	7000		3000		1400		490	1	80		8100		3500	
Styrene	ug/kg	900	U	770	U	770	U	<i>77</i> 0	U	63	U	3800		750	U
Xylenes (total)	ug/kg	34000		14000		6900		2400		390		38000		16000	
Vinyl acetate	ug/kg	1800	U	1500	บ	1500	U	1500	υ	130	U	1500	U	1500	U

J - This result should be considered a quantitative estimate.

Approved for Quality
Assurance Release by:

Rev. 6

Date 4(2/5)

File VOAs/Sa/Combiner

B - This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration.

U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

UJ - This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate.

Target Compound List Ae Organic Compounds
Soil Analytical Results
The Lubrizol Corporation
Greiner's Lagoon Site
Sandusky County, Ohio

SAMPLE LOCATION:		GL-SS-SN	1-2	GL-SS-SN	VI-2	GL-SS-SI	A-3	GL-SS-SI	M-3	GL-SS-SI	VI-3	GL-SS-SM-3	DUP	GL-SS-SN	M-3
DEPTH:	l	17-19		23'-25	i	5'-7'		15'-17	r	17-19		17'-19		21'-23	i ^r
DATE COLLECTED:	i	4/10/9	6	4/10/9	6	4/11/9	6	4/11/9	96	4/11/9	6	4/11/9	6	4/11/9	26
MOISTURE CONTENT:		15.7		24.1		40.0		19.6		19.1		18.7		21.2	
MATRIX:		SOLIE)	SOLIE)	SOLI)	SOLIE	D	SOLIT	,	SOLII)	SOLIE)
ANALYTE	UNITS					· · · ·									
Chloromethane	ug/kg	4200	U	1600	U	2100	U	7800	U	7700	U	1500	U	3200	U
Bromomethane	ug/kg	4200	υ	1600	U	2100	U	7800	U	7700	Ü	1500	U	3200	υ
Vinyl chloride	ug/kg	4200	U	1600	บ	2100	U	7800	บ	7700	U	1500	υ	3200	υ
Chloroethane	ug/kg	4200	U	1600	U	2100	U	7800	U	7700	U	1500	U	3200	U
Methylene chloride	ug/kg	2100	U	820	υ	1000	U	3900	U	3900	U	770	U	1600	υ
Acetone	ug/kg	2600	В	17000	j	1500	В	15000	В	30000	В	5100	В	53000	
Carbon disulfide	ug/kg	2100	U	820	Ū	1000	Ü	3900	U	3900	U	<i>7</i> 70	υ	1600	U
1,1-Dichloroethene	ug/kg	2100	U	820	υ	1000	U	3900	U	3900	υ	770	U	1600	บ
1,1-Dichloroethane	ug/kg	2100	U	820	U	1000	U	. 3900	U	3900	U	770	U	1600	U
1,2-Dichloroethene (total)	ug/kg	2100	ប	820	ប	1000	U·	3900	U	3900	บ	770	U	1600	U
Chloroform	ug/kg	2100	U	820	U	1000	U	3900	υ	3900	U	<i>7</i> 70	U	1600	U
1,2-Dichloroethane	ug/kg	2100	U	820	U	1000	U	3900	U	3900	U	770	U	1600	U
2-Butanone	ug/kg	8500	υ	3300	U	1900	1	16000	U	15000	U	3100	U	6300	U
1,1,1-Trichloroethane	ug/kg	2100	U	820	U	1000	Ü	3900	U	3900	U	770	U	1600	U
Carbon tetrachloride	ug/kg	2100	U	820	U	1000	U	3900	U	3900	U	770	U	1600	U
Bromodichloromethane	ug/kg	2100	U	820	υ	1000	U	3900	U	3900	U	770	U	1600	U
1,2-Dichloropropane	ug/kg	2100	U	820	U	1000	U	3900	U	3900	U	<i>7</i> 70	U	1600	U
cis-1,3-Dichloropropene	ug/kg	2100	U	820	U	1000	U	3900	U	3900	U	770	U	1600	U
Trichloroethene	ug/kg	2100	U	820	U	1000	υ	3900	U	1700	J	770	ប	1600	υ
Dibromochloromethane	ug/kg	2100	U	820	Ü	1000	U	3900	U	3900	U	770	U	1600	υ
1,1,2-Trichloroethane	ug/kg	2100	U	820	U	1000	U	3900	บ	3900	U	770	U	1600	U
Benzene	ug/kg	2100	Ü	820	U	1000	บ	3900	U	5300	J	820	J	1600	U
trans-1,3-Dichloropropene	ug/kg	2100	U	820	U	1000	U	3900	U	3900	บ	770	U	1600	U
Bromoform	ug/kg	2100	U	820	U	1000	υ	3900	U	3900	U	770	U	1600	U
4-Methyl-2-pentanone	ug/kg	64000		6200		8100		96000		69000	J	26000	J	2900	В
2-Hexanone	ug/kg	8500	U	3300	U	4200	U	16000	U	15000	U	3100	U	6300	U
Tetrachloroethene	ug/kg	2100	U	820	ប	1000	U	3900	U	3900	U	770	U	1600	U
1,1,2,2-Tetrachloroethane	ug/kg	2100	U	820	U	1000	U	3900	U	3900	U	770	U	1600	U
Toluene	ug/kg	3000		710	J	1300		5300		85000	J	9200	J	4500	
Chlorobenzene	ug/kg	2100	U	820	U	1000	U	3900	U	3900	U	770	U	1600	U
Ethylbenzene	ug/kg	4000	•	650	J	1000	U	3900	U	22000	3	2300	J	940	J
Styrene	ug/kg	2100	U	820	U	1000	ប	3900	U	3900	U	770	U	1600	U
Xylenes (total)	ug/kg	17000		2700		2000		2700	J	110000	J	11000	J	4700	
Vinyl acetate	ug/kg	4200	U	1600	U	2100	U	7800	U	7700	U	1500	υ	3200	ប

J - This result should be considered a quantitative estimate.

Approved for Quality
Assurance Release by:

Rev. 0

Date 6/12/26

File: VOAs/Sol/Combined 6/11/96

B - This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration.

U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

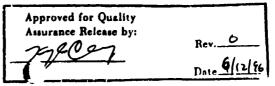
UJ - This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate.

Target Compound List: le Organic Compounds Soit Analytical Results The Lubrizol Corporation Greiner's Lagoon Bite Sandusky County, Ohio

SAMPLE LOCATION:	1	GL:55-54	4-4	GL 95-5N	4.4	CIL-95-9A	4.4	GL-SS-SA	A-4	GL-SS-SA	4-5	GLSS SM-5	SDUP
DRFTH:	į	5.7		15'-17		10.51.		211-231		5.7		5.7	
DATE COLLECTED:		4/11/9	6	4/11/9	6	4/11/9	6	4/11/9	6	4/10/9	h	4/10/9	*
MOISTURE CONTENT:		25 0		181		21.3		16 2		14.1		13.5	
MATRIX:		SOLID)	SOUR)	SOUR	,	SOLID	,	SOLID	+	SOLIE)
ANALYTE	UNITS			1									
Chloromethane	ug/kg	17000	U	1500	U	1600	ט ו	24	U	7300	υ	29000	U
Bromomethane	ug/kg	17000	U	1500	U	1600	U]	24	U	7300	U	29000	U
Vinyl chloride	ug/kg	17000	U	1500	υ	1600	υ	24	U	7300	U	29000	U
Chloroethane	ug/kg	17000	U	1500	U	1600	υ	24	U	7300	U	29000	t)
Methylene chloride	ug/kg	8300	U	760	u	790	υ	80	8	3600	U	14000	υ
Acetone	ug/kg	7100	8	1100	U	1900	B .	440		19000	B	(X)44	н
Carbon disulfide	ug/kg	8300	U	320	j	790	u	54	1	.1600	u	14000	U
1,1-Dichloraethene	ug/kg	8300	υ	760	Ú	790	υ	12	บ	3600	U	14000	U
1,1-Dichloroethane	ug/kg	8300	U	760	U	790	υ	12	U	3600	U	14000	IJ
1,2-Dichloroethere (total)	ug/kg	8300	υ	760	U	790	υ	12	U	3600	u	14000	U
Chloroform	ug/kg	8300	U	760	U	790	U	12	U	3600	U	140(X)	U
1,2-Dichloroethane	ug/kg	8300	U	760	u	790	υj	12	บ	3600	U	14000	U
2-Butanone	ug/kg	11000	U	3100	U	600	,	46	;	15000	U	58000	U
1,1,1 Trichloroethane	ug/kg	8300	บ	760	U	790	υ	12	U	3600	U	14000	U
Carbon tetrachloride	ug/kg	8300	υ	760	U	790	U	12	U	3600	U	14000	U
Hromodichloromethane	ug/kg	8.00	U	760	υ	790	U	12	U	3600	υ	14000	U
1.2 Dichloropropane	ug/kg	A300	U	760	U	790	U	12	U	3600	U	14000	U
cis 1,3 Dichloropropene	ug/kg	8300	U	760	U	740	U	12	U	3600	U	1.4(XX)	U
Trichloroethene	ug/kg	8,300	υ	760	υ	790	U	12	U	3600	U	14000	U
Dibromochloromethane	ug/kg	8300	U	760	U	790	U	12	U	1600	U	14000	ţ)
1,1,2 Trichloroethane	ug/kg	8300	U	760	U	790	U	12	บ	.1600	U	14000	U
Benzene	ug/kg	5600	j	520	J	790	U	12	U	1800	J	8600	ı
trans 1,3-Dichloropropene	ug/kg	8300	U	760	U	790	U	12	U	3600	U	14000	U
Bromoform	ug/kg	8300	υ	760	U	790	υ	12	U	3600	U	14000	U
4-Methyl-2 pentanone	ug/kg	28000	J	1400	В	15000		130		46000	J	00000	1
2 Hexanone	ug/kg	33000	U	3100	U	3200	U	49	U	15000	U	58000	U
Tetrachlomethene	ug/kg	8300	U	760	U	790	U	12	U	3600	U	14000	U
1.1,2.2-Tetrachloroethase	սաչ/հայ	8300	U	760	U	790	U	12	U	3600	U	14000	U
Toluene	ug/kg	140000		2700		790		45		5600	J	34000	J
Chlarobenzene	ug/kg	8300	U	760	บ	790	υ	12	U	3600	υ	14000	U
Ethylbenzene	ug/kg	76000		4000		840		47		3700	J	23000	;
Styrene	ug/kg	8300	U	760	U	790	U	12	U	3600	U	14000	U
Xylenes (total)	ug/kg	340000		20000		4200		220		22000	J	140000	J
Vinyl acetate	ug/kg	17000	u	1500	U	1600	บ	24	U	7300	U	29000	U

J - This result should be considered a quantitative estimate

UJ - This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate.



B - This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration

U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

Target Compound List le Organic Compounds Soil Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-SS-SI	M-5	GL-SS-SI	M-5	GL-SS-SM	1-5	GL-SS-SN	4-6	GL-SS-SI	1-6	GL-SS-SM	1-6
DEPTH:		11'-13	•	15-17		20'-22'	-	5'-7		11'-13		15'-17'	
DATE COLLECTED:		4/10/9		4/10/9		4/10/96	5	4/10/9	6	4/10/9		4/10/96	6
MOISTURE CONTENT:		18.4		22.1		21.0		19.0	_	20.3	_	18.3	_
MATRIX;		SOLIT)	SOLIE)	SOLID		SOLID	,	SOLIT	, 1	SOLID	
ANALYTE	UNITS	·											
Chloromethane	ug/kg	5100	υ	1600	υ	63	U	1500	υ	3100	υ	120	U
Bromomethane	ug/kg	5100	Ū	1600	U	63	Ū	1500	Ū	3100	Ū	120	U
Vinyl chloride	ug/kg	5100	U	1600	U	63	Ü	1500	Ū	3100	U	120	U
Chloroethane	ug/kg	5100	บ	1600	U	63	U	1500	Ū	3100	U	120	U
Methylene chloride	ug/kg	2600	บ	800	Ü	32	U	770	Ū	1600	U	33	В
Acetone	ug/kg	32000		17000)	1000		- 5900	В	27000		1900	j
Carbon disulfide	ug/kg	2600	υ	800	Ù	32	U	770	บ	1600	U	61	Ú
1,1-Dichloroethene	ug/kg	2600	U	800	U	32	Ū	770	Ū	1600	U	61	U
1,1-Dichloroethane	ug/kg	2600	Ū	800	ប	32	Ü	770	บ	1600	U	61	U
1,2-Dichloroethene (total)	ug/kg	2600	U	800	U	· 32	U	770	U	1600	U	61	U
Chloroform	ug/kg	2600	U	800	U	32	U	770	ប	1600	υ	61	υ
1,2-Dichloroethane	ug/kg	2600	U	800	Ū	32	U	770	ช	1600	ប	61	U
2-Butanone	ug/kg	10000	U	3200	U	17	j	3100	U	6300	υ	31	j
1,1,1-Trichloroethane	ug/kg	2600	U	800	U	32	Ü	770	U	1600	υ	61	U
Carbon tetrachloride	ug/kg	2600	υ	800	U	32	U	770	υ	1600	U	61	U
Bromodichloromethane	ug/kg	2600	υ	800	U	32	U	770	υ	1600	Ų	61	U
1,2-Dichloropropane	ug/kg	2600	U	800	ប	32	Ü	770	U	1600	U	61	U
cis-1,3-Dichloropropene	ug/kg	2600	U	800	Ü	32	Ü	770	U	1600	Ü.	61	U
Trichloroethene	ug/kg	2600	U	800	U	32	U	770	บ	1600	U	61	ប
Dibromochloromethane	ug/kg	2600	U	800	U	32	Ū	770	U	1600	υ	61	U
1,1,2-Trichloroethane	ug/kg	2600	U	800	ប	32	U	770	Ü	1600	U	61	U
Benzene	ug/kg	2600	U	800	ប	32	U	770	บ	1600	บ	61	U
trans-1,3-Dichloropropene	ug/kg	2600	U	800	υ	32	U	770	U	1600	U	61	U
Bromoform	ug/kg	2600	U	800	ប	32	U	770	บ	1600	บ	61	ប
4-Methyl-2-pentanone	ug/kg	55000		1400	J	84)	23000		35000		370	
2-Hexanone	ug/kg	10000	υ	3200	U	130	Ü	3100	U	6300	U	240	U
Tetrachloroethene	ug/kg	2600	U	800	ប	32	U	770	U	1600	U	61	ប
1,1,2,2-Tetrachloroethane	ug/kg	2600	U	800	ប	32	U	770	U	1600	U	61	U
Toluene	ug/kg	2600	U	800	υ	32	U	2100		1600	U	73	
Chlorobenzene	ug/kg	2600	ប	800	U	32	U	770	บ	1600	IJ	61	U
Ethylbenzene	ug/kg	2600	U	800	U	32	U	730	J	1600	U	. 29	J
Styrene	ug/kg	2600	U	800	U	32	U	770	U	1600	U	61	U
Xylenes (total)	ug/kg	2600	U	800	ช	32	ប	3500		1600	U	140	
Vinyl acetate	ug/kg	5100	U	1600	บ	63	ប	1500	บ	3100	U	120	U
l		1		!		1		i		1		l	

J - This result should be considered a quantitative estimate.

Approved for Quality
Assurance Release by:

Rev. 6

File. VOAs/Soil/Combin

B - This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration.

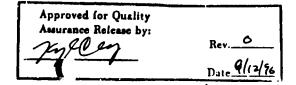
U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

UJ - This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate.

SAMPLE LOCATION		GL-56-5A	4.6	CIL-S6-SA	4-7	CIL-SS-SA	1.7	(31.555)	4.7	GL:58 SM 7	DUP	(11 444)	4.7
DEFIH:		20:-22		31-51		7.4		117-13	·	11513		15 17	
DATE COLLECTED:		4/10/9	6	4/11/9	b	4/11/9	6	4/11/9	h	4/11/9	6	4/12/9	h
MOISTURE CONTENT:		22 6		184		193		16.8		190		20 0	
MATRIX:		SOLID)	SOUTH)	SOLID	,	SOLIL	,	SOLID)	SOLID	ı
ANALYTE	UNITS				• • • • • • • • • • • • • • • • • • • •							· · · · · · · · · · · · · · · · · · ·	
Chloromethane	ug/kg	130	U	3100	U	1500	U	120	u	12	υ	42	U
Bromomethane	ug/kg	130	U	3100	U	1500	บ	120	U	12	U	42	U
Vinyl chloride	ug/kg	130	U	3100	u	1500	u	120	u	12	U	42	U
Chloroethane	ug/kg	130	U	3100	U	1500	U	120	U	12	U	42	U
Methylene chloride	ug/kg	33	В	1500	U	770	U	60	U	6.2	บ	21	υ
Acetone	ug/kg	1900		4500	В	16000		6500	J	60	В	470	
Carbon disulfide	ug/kg	65	U	1500	u	770	U	60	U	6.2	U	21	U
t,1 Dichloroethene	ug/kg	45	u	1500	t)	770	U	60	U	6.2	u	21	U
1,1-Dichloroethane	ug/kg	65	U	1500	U	770	u	M)	u	6 2	U	21	U
1,2-Dichloroethene (total)	ug/kg	65	U	1500	U	770	υ	60	u	6.2	U	21	U
Chloroform	ug/kg	65	U	1900	U	770	U	60	U	6.3	U	71	U
1,2 Dichloroethane	ug/kg	65	u	1500	U	770	u	60	U	6.2	u	21	U
2 Butanone	ug/kg	51)	6100	U	3100	U	74	J	36	J	#1	U
1,1,1-Trichloroethane	ug/kg	65	U	1500	U	770	υ	60	บ	6 2	U	21	U
Carbon tetrachloride	ug/kg	65	U	1500	U	770	U	60	υ	6.2	υ	21	U
Bromodichloromethane	ug/kg	65	U	1500	U	770	U	60	U	62	υ	21	(1)
1,2-Dichloropropane	ug/kg	65	U	1500	U	770	U	60	U	6 2	υ	21	U F
cis L3 Dichloropropeise	ug/kg	65	U	1500	U	770	U	60	U	6 2	U	21	U
Erichloroethene	ug/kg	65	U	1400	1	770	U	60	U	6 2	U	21	U
Dibromochloromethane	ug/kg	65	U	1500	U	770	U	60	υ	6 2	U	21	(1
1.1.2-Trichloroethane	ug/kg	65	U	1500	U	770	U	₩	U	6 2	U	21	U
Hervene	ug/kg	65	U	4300		770	U	60	U	62	U	21	U
trana-1,3-Dichloropropene	ug/kg	65	U	1500	U	770	U	60	U	6 2	U	21	U
Bromoform	ug/kg	65	U	1500	U	770	U	60	U	6 2	U	21	U
4-Methyl-2-pentanone	ug/kg	270		50000	1	28000		490	1	16	8	66	1
2-Hexanone	ug/kg	260	U	6100	U	3100	U	240	U	25	U	8 3	IJ
Tetrachloroethene	ug/kg	65	U	1500	υ	770	U	60	U	6 2	U	21	U
1.1.2.2-Tetrachloroethane	ug/kg	65	U	1500	U	770	U	(40	U	6 2	U	21	U
Toluene	ug/kg	65	U	43000		1200		51	J	62	U	21	U
Chlorobenzene	ug/kg	65	U	1500	IJ	770	U	60	U	62	U	21	U
lithylbenzene	ug/kg	65	U	10000		770	U	60	U	62	U	21	U
Styrene	ug/kg	65	υ	1500	U	770	U	60	U	62	U	21	U
Xylenes (total)	ug/kg	65	U	51000		560	J	41	1	62	U	21	U
Vinyl acetate	ug/kg	130	υ	3100	U	1500	U	1 120	U	12	U	42	U
1						1				l			

J. This result should be considered a quantitative estimate.

UJ - This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate



B. This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration

U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound

SAMPLE LOCATION:		GL-SS-SN	<i>1</i> -8	GL-SS-SN	M-8	GL-SS-SN	4-8	GL-SS-S	M-8	GL-SS-SN	A-8	GL-SS-SN	1-9
DEPTH:	J	0'-1'		3'-5'		7-9		11'-13	r]	15'-17		4'-6'	
DATE COLLECTED:		4/11/9	6	4/11/9	6	4/11/9	6	4/11/9	₂₆ 1	4/11/9	6	4/12/9	6
MOISTURE CONTENT:		17.6		15.9		15.4		16.9		18.4		18.4	
MATRIX:		SOLID	,	SOLIE)	SOLIE	, ·	SOLU)	SOLID)	SOLID)
ANALYTE	UNITS			-									
Chloromethane	ug/kg	30000	U	30000	U	7400	υ	3000	υ .	20	U	12	U
Bromomethane	ug/kg	30000	U	30000	U	7400	υ	3000	υ	20	U	12	U
Vinyl chłoride	ug/kg	30000	U	30000	U	7400	υ	3000	υ	20	υ	12	U
Chloroethane	ug/kg	30000	U	30000	Ü	7400	U	3000	U	20	บ	12	U
Methylene chloride	ug/kg	15000	U	15000	U	3700	υ	1500	U	10	U	6.1	U
Acetone	ug/kg	61000	U	21000	В	7100	В	6800	В	200		25	υ
Carbon disulfide	ug/kg	15000	U	15000	U	3700	U	1500	บ	10	υ	6.1	υ
1,1-Dichloroethene	ug/kg	15000	U	15000	U	3700	U	1500	υ	10	ប	6.1	U
1,1-Dichloroethane	ug/kg	15000	υ	15000	U	3700	υ	1500	υ	10	U	6.1	U
1,2-Dichloroethene (total)	ug/kg	15000	ប	15000	U	3700	U	1500	υ	10	U	6.1	U
Chloroform	ug/kg	15000	U	15000	U	3700	U	1500	U	10	U	6.1	U
1,2-Dichloroethane	ug/kg	15000	U	15000	υ	3700	บ	1500	U	10	U	6.1	U
2-Butanone	ug/kg	61000	U	59000	U	15000	บ	6000	υ	41	U	25	υ
1,1,1-Trichloroethane	ug/kg	15000	U	15000	U	3700	U	1500	υ	10	U	6.1	U
Carbon tetrachloride	ug/kg	15000	U	15000	U	3700	U	1500	U	10	U	6.1	U
Bromodichloromethane	ug/kg	15000	U	15000	U	3700	U	1500	υ	10	U	6.1	U
1,2-Dichloropropane	ug/kg	15000	U	15000	U	3700	U	1500	ប	10	บ	61	U
cis-1,3-Dichloropropene	ug/kg	15000	U	15000	U	3700	U	1500	U	10	υ	6.1	U
Trichloroethene	ug/kg	9500	J	<i>7</i> 700	1	2100	j	1500	υ	10	U	6.1	U
Dibromochloromethane	ug/kg	15000	U	15000	U	3700	U	1500	U	10	U	6.1	U
1,1,2-Trichloroethane	ug/kg	15000	υ	15000	U	3700	U	1500	U	10	U	6.1	υ
Benzene	ug/kg	27000		25000		5200		880	}	10	U	6.1	U
trans-1,3-Dichloropropene	ug/kg	15000	υ	15000	U	3700	U	1500	U	10	U	6.1	U
Bromoform	ug/kg	15000	U	15000	U	3700	U	1500	U	10	U	6.1	U
4-Methyl-2-pentanone	ug/kg	100000	J	140000		45000	J	18000	J	32	J	25	U
2-Hexanone	ug/kg	61000	U	59000	U	15000	U	6000	U	41	U	25	υ
Tetrachloroethene	ug/kg	15000	U	15000	U	3700	U	1500	ប	10	U	6.1	U
1,1,2,2-Tetrachloroethane	ug/kg	15000	U	15000	U	3700	υ	1500	U	10	U	6.1	U
Toluene	ug/kg	330000		290000		81000		11000		5.1	J	6.1	υ
Chlorobenzene	ug/kg	15000	ប	15000	U	3700	U	1500	U	10	U	6.1	U
Ethylbenzene	ug/kg	97000		. 110000		30000		5000		10	U	6.1	U
Styrene	ug/kg	15000	U	15000	U	3700	U	1500	υ	10	U	6.1	บ
Xylenes (total)	ug/kg	460000		520000		150000		24000		10	U	6.1	ប
Vinyl acetate	ug/kg	30000	U	30000	U	7400	U	3000	U	20	U	12	U

J - This result should be considered a quantitative estimate.

Approved for Quality
Assurance Release by:

Rev. O

File: VOAs/Soil/Combined 6/11/96

B - This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration.

U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

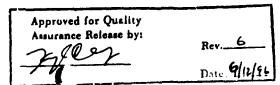
UJ - This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate.

Target Compound List : Ae Organic Compounds Soil Analytical Results The Lubrizol Corporation Greiner's Lagoon Bite Sandusky County, Ohio

SAMPLE LOCATION:	1	GL-55-SA	4.0	GL-SS-SM	6.9	GL 58-9M	1-10 I	G1-56-5M	1-10 T	GI SASM	-10	GI 98.9	45
DEPTH	1	6'-8'		12 -14		4'-6'	J	6'-8		12'-14'		0-1	
DATE COLLECTED:		4/12/9	ا ه	4/12/96	.	4/12/9	ı İ	4/12/9	i	4/12/9	•	4/10/9	H
MOISTURE CONTENT:	1	18 9		20 0		19 1	· 1	16.2		20 9		20.3	
MATRIX		SOLID		SOLID		SOLID	. 1	SOLID	,	SOLID		SOLID)
ANALYTE	UNITS						ŀ						.,
Chloromethane	ug/kg	12	u (13	u	12	U	12	U	13	υ	2600	U
Promomethane	ug/kg	12	U	13	u	12	U	12	U I	13	U	3600	U
/inyl chloride	ug/kg	12	U	13	u	12	U	12	U	13	U	2600	u
hloroethane	ug/kg	12	U	13	U	12	U	12	u	13	IJ	2600	IJ
dethylene chloride	ug/kg	6.2	U	6.3	U	6.2	υ	6.0	υ	6.3	U	1700	t)
\c eteme	ug/kg	12	, (33		25	U	71	1	36		1700	B
arbon duullide	ug/kg	62	ΰ	6.3	υ	62	U	60	u	6.3	U	1 100	U
1,1 Dichlorouthene	ug/kg	6.2	υ	6.3	U	62	U	60	t/	6.3	u	1700	U
1,1-Dichloroethane	ug/kg	62	u	63	บ	62	υ	60	U	6.3	U	1300	U
,2 Dichloroethene (total)	ug/kg	6 2	U	6.3	U	62	u [6.0	U	6.3	U	1 100	U
hloroform	ug/kg	6.2	U	6.3	υ	6.2	น	6.0	U	6.3	υ	1300	U
2-Dichloroethane	ug/kg	6.2	บ	6.3	υ	62	U	60	υ	6.3	U	1 100	U
Butanone	ug/kg	25)	75)	25	เม	49	J	40	J	1200	U
.1,1-Trichlorgethane	ug/kg	62	U	63	U	62	υį	60	U	6 3	U	1 100	U
arbon tetrachloride	ug/kg	62	υ	6.3	U	6.2	U	60	U	6.3	U	1100	U
Iromodichloromethane	ug/kg	62	υ	6.3	U	6 2	U	60	U	6.3	U	1700	U
2 Dichloropropane	ug/kg	6 2	U	61	U	6.2	U	60	U	6.3	U	1100	U
is 1.3-Dichlaropropene	ug/kg	6 2	U	63	U	6 2	U	60	U	61	Ð	1 100	U
richloroethene	ug/kg	6 2	U	61	U	6.2	U	60	U	6.3	U	1300	D
Dibromochloromethane	ug/kg	62	U	63	U	6 2	U	60	υ	6.3	U	1300	U
,1.2-Trichloroethane	ug/kg	6 2	U	63	U	62	υ	6.0	υ	63	U	1700	U
lenzene	ug/kg	62	U	63	υ	62	U	49	- 1 }	6.3	U	1300	U
rana-1.3-Dichloropropene	ug/kg	62	U	63	IJ	62	υ	60	U	63	U	1300	U
Bromoform	ug/kg	62	U	63	υ	62	υ	60	υ	6.3	υ	1300	U
-Methyl-2-pentanone	ug/kg	25	U	79	1	25	υ	56	J [3.9	J	5200	U
2 Hexanone	ug/kg	25	U	53	J	25	U	24	U	25	U	5200	U
Tetrachloroethene	ug/kg	6 2	U	6.3	U	62	U	60	U	63	U	1300	U
.1,2,2-Tetrachloroethane	ug/kg	6 2	U	63	U	62	υ	60	U	63	U	1300	U
foluene	ug/kg	6 2	U	6.3	U	62	U	60	υ	6.3	U	1300	
'hlorobenzene	ug/kg	62	U	63	U	62	U	60	υĮ	6.3	U	1300	U
ithylbenzene	ug/kg	62	U	63	U	62	U	60	ן ט	6.3	U	3500	
ityrene	ug/kg	62	U	63	U	62	υ	6 D	บ	63	U	1300	U
(ylenes (total)	ug/kg	62	U	63	U	36	1	6.0	U	6.3	U	26000	
Vinyl acetate	ug/kg	12	U	13	U	12	u	12	U	13	U	2600	U

J - This result should be considered a quantitative estimate.

U] - This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate



B. This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration

U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound

SAMPLE LOCATION:		GL-WS-S	M-1	GL-WS-SM-1	DUP	GL-WS-S	M-4	GL-WS-S	M-8	GL-WS-S	M-9	GL-WS-ER	-101*	GL-WS-EI	R-102*
DEPTH:		N/A		N/A		N/A		N/A		N/A		N/A		N/A	4
DATE COLLECTED:		4/9/9	6	4/9/96		4/11/9	6	4/11/9	96	4/12/9	6	4/9/9	6	4/10/	96
MOISTURE CONTENT:		N/A		N/A		N/A		N/A		N/A		N/A		N/A	4
MATRIX:		WATE	R	WATER	t	WATE	R	WATE		WATE		WATE	R	WATE	ER
ANALYTE	UNITS	······									···				
Chloromethane	ug/L	10000	U	5000	U	8300	บ	12000	· U	10	U	10	U .	10	υ
Bromomethane	ug/L	10000	U	5000	U	8300	บ	12000	U	10	บ	10	U	10	U
Vinyl chloride	ug/L	10000	U	5000	U	8300	บ	12000	U	10	υ	10	U	10	υ
Chloroethane	ug/L	10000	บ	5000	υ.	8300	U	12000	U	10	บ	10	υ	10	U
Methylene chloride	ug/L	5000	U	2500	U	4200	บ	6200	U	5.0	บ	5.0	U	5.0	U
Acetone	ug/L	27000		23000		110000		170000		18	В	5.0	j	6.2	J
Carbon disulfide	ug/L	5000	U	2500	U	4200	U	6200	υ	5.0	U	5.0	Ü	5.0	Ü
1,1-Dichloroethene	ug/L	5000	U	2500	U	4200	U	6200	Ū	5.0	U	5.0	U	5.0	U
1,1-Dichloroethane	ug/L	5000	U	2500	υ	4200	U	6200	ប	5.0	U	5.0	U	5.0	U
1,2-Dichloroethene (total)	ug/L	5000	U	2500	บ	4200	U	6200	U	5.0	U	5.0	U	5.0	U
Chloroform	ug/L	5000	U	2500	U	4200	ช	6200	ប	5.0	U	26		27	
1,2-Dichloroethane	ug/L	5000	U	2500	U	4200	บ	6200	U	5.0	U	5.0	U	5.0	U
2-Butanone	ug/L	20000	U	10000	U	22000		25000	U	20	U	20	U	20	U
1,1,1-Trichloroethane	ug/L	5000	U	2500	U	4200	U	6200	U	5.0	บ	5.0	ប	5.0	U
Carbon tetrachloride	ug/L	5000	U	2500	U	4200	U.	6200	U	5.0	U	5.0	U	5.0	U
Bromodichloromethane	ug/L	5000	ប	2500	U	4200	U	6200	U	5.0	U	6.4		6.5	
1,2-Dichloropropane	ug/L	5000	U	2500	U	4200	U	6200	U	5.0	U	5.0	U	5.0	U
cis-1,3-Dichloropropene	ug/L	5000	U	2500	U	4200	U	6200	Ü	5.0	U	5.0	υ	5.0	U
Trichloroethene	ug/L	i 5000	U	2500	U	4200	U	6200	U	5.0	U	5.0	U	5.0	υ
Dibromochloromethane	ug/L	5000	U	2500	U	4200	U	6200	U	5.0	U	5.0	U	5.0	U
1,1,2-Trichloroethane	ug/L	5000	U	2500	U	4200	U	6200	υ	5.0	U	5.0	U	5.0	U
Benzene	ug/L	2200	1	2300	J	4200	U	6200	υ	5.0	U	5.0	U	5.0	U
trans-1,3-Dichloropropene	ug/L	5000	Ū	2500	Ü	4200	U	6200	υ	5.0	υ	5.0	U	5.0	υ
Bromoform	ug/L	5000	U	2500	U	4200	U	6200	U	5.0	U	5.0	ប	5.0	U
4-Methyl-2-pentanone	ug/L	120000		75000		110000		85000		20		20	U	20	U
2-Hexanone	ug/L	20000	Ü	10000	U	17000	U	25000	บ	20	U	20	U	20	U
Tetrachloroethene	ug/L	5000	Ü	2500	U	4200	บ	6200	U	5.0	U	5.0	U	5.0	U
1,1,2,2-Tetrachloroethane	ug/L	5000	U	2500	U	4200	U	6200	U	5.0	U	5.0	U	5.0	U
Toluene	ug/L	3000	В	3300	В	10000		6200	U	5.0	U	5.0	U	5.0	U
Chlorobenzene	ug/L	5000	U	2500	U	4200	U	6200	U	5.0	U	5.0	U	5.0	U
Ethylbenzene	ug/L	5000	U	2500	U	3800	j	6200	U	5.0	U	5.0	U	5.0	U
Styrene	ug/L	5000	U	2500	U	4200	Ü	6200	U	5.0	U	5.0	บ	5.0	U
Xylenes (total)	ug/L	1400	3	1300	J	19000		6200	U	5.0	U	5.0	U	5.0	U
Vinyl acetate	ug/L	10000	Ú	5000	Ú	8300	U	12000	U	10	U	10	U	10	U
,	5 -	1						Į.						1	

J - This result should be considered a quantitative estimate.

N/A - Not applicable.

Approved for Quality
Assurance Release by:

Rev. O

Date 4/2/2

File: VOA/Ag/Combined 8/12/96

B - This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration.

U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

UJ - This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate.

^{* -} This sample is an Equipment Rinsate Blank.

^{** -} This sample is a Travel Blank.

Target Compound List¹S. Ale Organic Compounds Aqueous Analytical Results The Lubricol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL WS-FIR	-103*	GL-WS-RR-	104*	GL WS-TB	201**	GL-WS-TB	-303	GL-WS-TB-	203**	GL-WS-TB-	204**	GI WS TB	204**
DEPTH:		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
DATE COLLECTED:		4/11/9	16	4/11/96	•	4/9/9		4/10/9	24	4/11/9	6	4/11/9	•	4/12/4	M
MOISTURE CONTENT:		N/A		N/A		N/A		N/A		41696 ()	N/A		N/A	
MATRIX		WATE	R	WATEN	1	WATE	R	WATE	R	WATE	R	WATE	t	WATE	R
ANALYTE	UNITS							1		· · · · · · · · · · · · · · · · · · ·					
Chloromethane	ug/L	10	U	10	U	10	υ	10	U	10	U	10	υ	10	u
Bromomethane	ug/L	10	u	10	U	10	U	10	U	10	u	10	U	10	U
Vinyl chloride	ug/L	10	U	10	U	10	υ	10	υ	10	U	10	U	10	u
Chloroethane	ug/L	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Methylene chloride	ug/1	50	u	50	U	50	U	50	U	50	U	50	U	5.0	IJ
Acetone	υ g/1 .	20	U	56	J	20	U	37	1	20	U	20	U	20	U
Carbon disulfide	ug/L	50	U	50	Ü	50	U	50	Ü	50	U	50	U	50	t)
1,1 Dichloroethene	ug/L	50	U	50	U	50	υ	50	บ	50	U	50	ţı	50	U
1.1-Dichloroethane	ug/l	50	U	50	U	50	υ	50	U	50	U	50	1)	50	U
1.2-Dichloroethene (total)	ug/L	50	U	50	U	50	U	50	U	50	U	50	U	50	U
Chloroform	ug/1.	19		15		50	U	50	U	50	U	50	U	50	U
1.2-Dichloroethane	u g/1 .	50	U	50	U	50	U	50	U	50	U	50	U	50	U
2 Butanine	ug/1.	20	u	20	u	20	U	20	U	20	U	20	U	20	t)
1.1.1-Trichloroethane	ug/L	50	U	50	U	50	U	50	U	50	ti	50	U	5.0	17
Carbon tetrachloride	ug/L	50	U	50	U	50	U	50	U	50	U	50	U.	5.0	U
Bromodichloromethane	ug/L	3.9	j	3.5	J	50	U	50	U	50	U	50	U	50	U
1.2 Dichloropropane	ug/L	50	U	50	U	50	U	50	U	50	t!	50	(I)	50	U
cis 1.3-Dichloropropene	ug/L	50	U	50	U	50	U	50	U	50	U	50	U	50	U
Luchloroethene	ug/t	50	(1	5.0	U	50	U	50	U	50	U	50	t 1	5.0	U
i bbromochloromethane	ug/1.	50	U	5.0	U	50	U	50	U	5.0	U	50	U	50	U
1,1,2-Trichloroethane	ug/l	50	U	50	U	50	U	50	U	5.0	U	50	Ð	50	U
Benzene	ug/1.	50	υ	50	U	50	υ	50	υ	50	υ	50	U	50	t1
trans-1,3-Dichloropropene	ug/t.	50	U	50	U	50	U	50	U	50	U	5.0	U	5.0	U
Hromoform	ug/L	50	U	50	U	50	U	50	U	50	U	5.0	ţ)	5.0	U
4 Methyl 2 pentanone	ug/L	20	U	31	1	20	U	20	U	20	U	20	U	20	U
2 Hexanone	ug/L	20	U	20	U	20	U	20	υ	20	U	20	U	20	U
Tetrachloroethene	ug/L	50	U	50	U	50	U	50	U	50	υ	50	U	50	U
1.1.2.2-Tetrachloroethane	ug/L	5 0	U	50	U	50	U	50	U	50	U	50	U	50	U
Toluene	ug/L	50	U	50	U	26	J	50	U	50	U	50	U	50	U
Chlorobenzene	ug/L	50	U	50	U	50	υ	50	บ	50	U	50	U	50	υ
Ethylbenzene	ug/L	50	U	50	U	50	U	50	U	50	U	50	U	50	U
Styrene	ug/1.	50	U	50	U	50	U	50	U	50	U	50	U	50	U
Xylenes (total)	ug/L	50	U	50	U	5.0	U	5.0	U	50	t)	50	U	50	U
Vinyl acetate	ug/L	10	U	10	U	10	U	10	U	10	U	10	U	10	U
-	.,	l				1		1				I			

- J This result should be considered a quantitative estimate
- B. This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration
- U This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.
- UJ This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate.

N/A - Not applicable

- * This sample is an Equipment Rinsate Blank
- ** This sample is a Travel Blank.

Approved for Quality
Assurance Release by:
R

Rev. 6

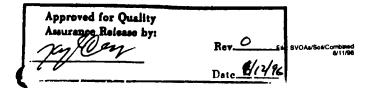
File VOA/Aq/Comb 6/1

SAMPLE LOCATION:		GL-SS-SM	1-1	GL-SS-S	M1	GL-SS-SM1	DUP	GL-SS-S	SM1	GL-SS-S	M1	GL-SS-S	M-2	GL-SS-SI	M-2
DEPTH:	ļ	5'- <i>7</i> '		15'-17	"	15'-17	•	17'-19	y]	21'-23	•	3'-5'		15'-17	,
DATE COLLECTED:		4/9/96	,	4/9/9	6	4/9/9	6	4/9/9	6	4/9/9	6	4/10/9	96	4/10/9	96
MOISTURE CONTENT:		30.3	}	18.3		19.2		18.5		20.1		16.4		16.6	
MATRIX:		SOLID		SOLI)	SOLIE)	SOLI	D	SOLIE)	SOLII	o '	SOLIT	D
ANALYTE	UNITS														
Phenol	ug/kg	1600	} [3100		3100	J	990		390	J	21000	J	4900	
bis(2-Chloroethyl) ether	ug/kg	4700	υ	1600	υ	4100	U	400	υ	410	U	79000	บ	990	U
2-Chlorophenol	ug/kg	4700	ս	1600	υ	4100	U	400	υ	410	υ	79000	Ü	990	U
1,3-Dichlorobenzene	ug/kg	4700	U)	1600	บ	4100	บ	400	U	410	U	79000	ប	990	U
1,4-Dichlorobenzene	ug/kg	490	1	210	J	410	J	400	υ	410	U	79000	υ	990	U
1,2-Dichlorobenzene	ug/kg	1300	j	<i>7</i> 70	J	1200	j	400	υ	410	υ	79000	U	210	J
2-Methylphenol	ug/kg	4700	U	220	J	4100	U	41	j	410	U	79000	Ü	650	J
2,2'-Oxybis(1-Chloropropane)	ug/kg	4700	บ	1600	υ	4100	U	400	Ü	410	U	79000	U	990	U
4-Methylphenol	ug/kg	4700	ט	1600	U	4100	υ	47	1	410	U	79000	υ	1100	
N-Nitrosodi-n-propylamine	ug/kg	4700	υ	1600	υ	4100	U	400	U	410	U	79000	U	990	U
Hexachloroethane	ug/kg	4700	บ	1600	U	4100	U	400	υ	410	U	79000	U	990	U
Nitrobenzene	ug/kg	4700	ប	1600	U	4100	U	400	U	410	U	79000	U	99 0	U
Isophorone	ug/kg	4700	υJ	1600	Ü	4100	U	400	U	410	ប	79000	U	750	J
2-Nitrophenol	ug/kg	4700	υÌ	1600	U	4100	U	400	υ	410	U	79000	ប	99 0	υ
2,4-Dimethylphenol	ug/kg	4700	บ	1600	บ	4100	บ	400	υ	410	U	79000	υ	990	
bis(2-Chloroethoxy)methane	ug/kg	4700	υ	1600	υ	4100	U	400	บ	410	υ	79000	U	990	U
2,4-Dichlorophenol	ug/kg	4700	υ	1600	U	4100	U	400	U	410	U	79000	U	990	U
1,2,4-Trichlorobenzene	ug/kg	1500	J · (660	J	1100	J	400	ប	410	Ü	79000	ប	990	U
Naphthalene	ug/kg	770	j	560	j	850	j	400	υ	410	U	8600	J	1100	
4-Chloroaniline	ug/kg	4700	Ú	1600	U	4100	Ü	400	U	410	บ	79000	U	990	U
Hexachlorobutadiene	ug/kg	4700	ֿ ט	1600	U	4100	U	400	υ	410	บ	79000	บ	990	U
4-Chloro-3-methylphenol	ug/kg	4700	υ	1600	υ	4100	U	400	U	410	U	79000	υ	990	บ
2-Methylnaphthalene	ug/kg	930	i	960	J	1500	j	400	U	410	U	79000	υ	580	J
Hexachlorocyclopentadiene	ug/kg	23000	ΰ	7800	Ü	20000	Ú	2000	บ	2000	U	380000	υ	4800	υ
2,4,6-Trichlorophenol	ug/kg	4700	υ	1600	U	4100	บ	400	U	410	U	79000	U	990	U
2,4,5-Trichlorophenol	ug/kg	4700	Ü	1600	U	4100	U	400	U	410	U	79000	υ	99 0	υ
2-Chloronaphthalene	ug/kg	4700	υ	1600	υ	4100	U	400	U	410	U	79000	U	990	U
2-Nitroaniline	ug/kg	23000	Ū	7800	U	20000	U	2000	บ	2000	U	380000	υ	4800	U
Dimethyl phthalate	ug/kg	4700	U	1600	U	4100	U	400	U	410	U	79000	U	990	U
Acenaphthylene	ug/kg	4700	U	1600	U	4100	U	400	U	410	U	79000	U	990	U
2,6-Dinitrotoluene	ug/kg	4700	ับ	1600	U	4100	บ	400	υ	410	υ	79000	υ	990	บ
3-Nitroaniline	ug/kg	23000	ΰ	7800	Ū	20000	Ū	2000	ΰ	2000	U	380000	U	4800	บ
Acenaphthene	ug/kg	4700	บั	1600	Ū	4100	Ū	400	Ü	410	U	79000	U	990	U
2,4-Dinitrophenol	ug/kg	23000	ΰ	7800	Ū	20000	Ū	2000	Ü	2000	U	380000	υ	4800	ប
4-Nitrophenol	ug/kg	23000	ŭ	7800	Ü	20000	Ü	2000	บ	2000	Ū	380000	U	4800	U
Dibenzofuran	ug/kg	4700	ΰ	1600	Ü	4100	Ü	400	Ū	410	Ū	79000	U	990	U
2,4-Dinitrotoluene	ug/kg	4700	. U	1600	Ü	4100	U	400	บ	410	Ū	79000	U	990	U

SAMPLE LOCATION:		GL-SS-S	M-1	GL-56-9	MI	GL-99-5M1	DUP	G196-9	IMI I	GL-96-8	M1	GtSS-S	M 2	GLSS SI	M 2
DEPTH:		5:7		15'-17	•	15'-17	•	17'-19	·	211-23		31-51	1	15117	7 [.]
DATE COLLECTED:		4/9/9	x	4/9/9	16	4/9/9	6	4/9/9	6	4/9/9	6	4/10/9	16	4/10/9	46
MOISTURE CONTENT:		30.3		183		19.2		18.5		20.1		16 4	Î	16.6	
MATRIX:		SOLI	ם ס	SOLU	D	SOLIT)	SOLI	D	SOLI)	SOLI)	SOLI	D
ANALYTE	UNITS			l		Ĭ									
Diethyl phthalate	ug/kg	4700	υ	1600	U	4100	U	400	U	410	U	79000	υ	990	u
Chlorophenyl phenyl ether	ug/kg	4700	U	1600	U	4100	U	400	U	410	U	79000	U	990	U
luorene	ug/kg	4700	U	1600	U	4100	U	400	U	410	U	79000	U	99()	n
Nitroaniline	ug/kg	23000	υ	7800	U	20000	U	2000	U	2000	U	380000	υ	4800	U
l.b-Dinitro-2-methylphenol	ug/kg	23000	υ	7800	u	20000	U	2000	u l	2000	u	380000	U	4800	U
N-Nitrosodiphenylamine	ug/kg	4700	U	1600	υ	4100	U	400	U	410	U	79000	U	990	U
4-Bromophenyl phenyl ether	ug/kg	4700	U	1600	U	4100	υ	400	υ	410	U	79000	U	99()	U
lexachlorobenzene	ug/kg	4700	U	1600	U	4100	U	400	υ	410	U	79000	U	990	U
Pentachlorophenol	ug/kg	23000	U	7800	U	20000	U	2000	U	2000	U	380000	U	4800	U
Phenanthrene	ug/kg	520	j	350	J	520	1	400	u	410	U	79000	U	990	U
Anthracene	ug/kg	4700	Ü	1600	υ	4100	U	400	U	410	U	79000	U	990	U
Carbazole	ug/kg	4700	υ	1600	υ	4100	υ	400	U	410	U	79000	υ	990	U
Di n butyl phthalate	ug/kg	4700	U	1600	U	4100	U	400	υ	410	U	79000	U	550	j
Fluoranthene	ug/kg	4700	U	1600	U	4100	U	400	U	410	U	79000	U	990	U
Pyrene	ug/kg	4700	U	1600	υ	4100	υ	400	U	410	U	79000	U	990	U
Butyl benzyl phthalate	ug/kg	4700	U	1600	υ	4100	U	400	U	410	U	79000	U	1000	
3,3'-Dichlorobenzidine	ug/kg	23000	υ	7800	U	20000	U	2000	υ	2000	U	380000	U	4800	U
Benzo(a)anthracene	ug/kg	4700	U	1600	υ	4100	U	400	υ	410	U	79000	U	990	υ
Chrysene	ug/kg	4700	U	1600	υ	4100	U	400	U	410	บ	79000	U	990	U
bis(2-Ethylhexyl) phthalate	ug/kg	29000		2900		2500	J	1000		510		550000		6000	
Di-n-octyl phthalate	ug/kg	4700	U	1600	U	4100	U	400	υ	410	U	79000	υ	990	U
Benzo(b)fluoranthene	ug/kg	4700	U	1600	υ	4100	U	400	U	410	U	79000	U	990	U
Benzo(k)fluoranthene	ug/kg	4700	υ	1600	U	4100	U	400	U	410	υ	79000	U	990	U
Benzo(a)pyrene	ug/kg	4700	U	1600	U	4100	U	400	U	410	U	79000	U	990	U
Indeno(1,2,3-cd)pyrene	ug/kg	4700	U	1600	υ	4100	U	400	U	410	U	79000	U	990	U
Dibenz(a,h)anthracene	ug/kg	4700	U	1600	υ	4100	υ	400	U	410	U	79000	U	990	U
Benzo(ghi)perylene	ug/kg	4700	U	1600	U	4100	U	400	U	410	U	79000	U	990	υ

J - This result should be considered a quantitative estimate.

UJ - This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate.



B. This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration.

U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

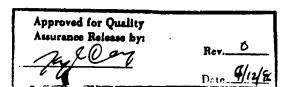
et Compound List Sen atile Organic Compos Soil Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-SS-SN		GL-SS-SN	1-2	GL-SS-	SM-3	GL-SS-S	M-3	GL-SS-S	6M-3	GL-SS-SM-	3 DUP	GL-SS-S	SM-3
DEPTH:		17'-19'		23'-25'	1	5'-7	7'	15'-1'	7'	17'-19	9,	17'-19)'	21'-2	3'
DATE COLLECTED:		4/10/9	6	4/10/9	6	4/11,	/96	4/11/	96	4/11/	96	4/11/	96	4/11/	96
MOISTURE CONTENT:		15.7	į	24.1		40.0	0	19.6		19.1		18.7		21.2	?
MATRIX:		SOLID		SOLID	,	SOL	ID	SOLI	D	SOLI	D	SOLII	D	SOLT	D
ANALYTE	UNITS														
Phenol	ug/kg	9700		430	U	4000	J	81000		62000		46000		5300	
bis(2-Chloroethyl) ether	ug/kg	1600	U	430	U	1100	U	49000	υ	16000	U	10000	U	1700	U
2-Chlorophenol	ug/kg	1600	U	430	υ	1100	UJ	49000	U	16000	ប	10000	U	1700	U
1,3-Dichlorobenzene	ug/kg	1600	U	430	υ	1100	U	49000	U	16000	U	10000	U	1700	u
1,4-Dichlorobenzene	ug/kg	1600	U	430	U	1100	U	9300	J	16000	U	10000	U	350	J
1,2-Dichlorobenzene	ug/kg	1600	ប	430	U	140	J	24000	J	4100	J	10000	U	880	J
2-Methylphenol	ug/kg	1600	U	430	U	130	J	6300	j	16000	υ	10000	U	290	J
2,2'-Oxybis(1-Chloropropane)	ug/kg	1600	บ	· 430	U	1100	U	49000	U	16000	υ	10000	บ	1700	U
4-Methylphenol	ug/kg	1600	U	430	U	2000	J	8200	J	1900	j	1600	J	410	j
N-Nitrosodi-n-propylamine	ug/kg	1600	υ	430	U	1100	U	49000	U	16000	U	10000	U	1 7 00	U
Hexachloroethane	ug/kg	1600	U	430	U	1100	U	49000	U	16000	U	10000	U	1700	U
Nitrobenzene	ug/kg	1600	U	430	U	1100	U	49000	U	16000	U .	10000	U	1700	U
Isophorone	ug/kg	1600	U	160	J	1100	U	6700	J	16000	U	10000	U	1700	Ü
2-Nitrophenol	ug/kg	1600	U	430	υ	1100	UJ	49000	U	16000	U	10000	U	1700	U
2,4-Dimethylphenol	ug/kg	1600	U	430	บ	180	J	49000	U	16000	บ	10000	U	1700	U
bis(2-Chloroethoxy)methane	ug/kg	1600	บ	430	U	1100	U	49000	· U	16000	U	10000	U	1700	U
2,4-Dichlorophenol	ug/kg	1600	บ	430	U	1100	UJ	49000	U	16000	U	10000	U	1700	U
1,2,4-Trichlorobenzene	ug/kg	1600	U	430	U	190	J	24000	J	4200	J	10000	U	860	J
Naphthalene	ug/kg	370	J	430	U	290	J	16000	J	2800	J	10000	υ	790	J
4-Chloroaniline	ug/kg	1600	บ	430	U	1100	U	49000	υ	16000	U	10000	U	1700	U
Hexachlorobutadiene	ug/kg	1600	U	430	U	1100	U	49000	U	16000	Ü	10000	U	1700	U
4-Chloro-3-methylphenol	ug/kg	1600	U	430	U	1100	UJ	49000	U	16000	U	10000	บ	1700	ប
2-Methylnaphthalene	ug/kg	1600	U	430	U	300	j	25000	J	4600	J	10000	U	1400	J
Hexachlorocyclopentadiene	ug/kg	7600	U	2100	U	5300	U	240000	U	79000	U	49000	Ū	8100	υ
2,4,6-Trichlorophenol	ug/kg	1600	U	430	U	1100	UJ	49000	U	16000	U	10000	บ	1700	U
2,4,5-Trichlorophenol	ug/kg	1600	ប	430	U	1100	UJ	49000	U	16000	U	10000	U	1700	U
2-Chloronaphthalene	ug/kg	1600	ប	430	บ	1100	บ	49000	U	16000	· U	10000	U	1700	U
2-Nitroaniline	ug/kg	7600	υ	2100	U	5300	U	240000	U	79000	U	49000	ย	8100	U
Dimethyl phthalate	ug/kg	1600	U	430	U	1100	U	49000	υ	16000	U	10000	U	1700	U
Acenaphthylene	ug/kg	1600	U	430	U	1100	Ü	49000	Ū	16000	U	10000	U	1700	U
2,6-Dinitrotoluene	ug/kg	1600	U	430	U	1100	U	49000	U	16000	U	10000	U	1700	U
3-Nitroaniline	ug/kg	7600	U	2100	U	5300	U	240000	υ	79000	U	49000	U	8100	U
Acenaphthene	ug/kg	1600	U	430	U	1100	U	49000	U	16000	U	10000	U	1700	U
2,4-Dinitrophenol	ug/kg	7600	U	2100	U	5300	UJ	240000	U	79000	U	49000	U	8100	U
4-Nitrophenol	ug/kg	7600	U	2100	U	5300	ÚĴ	240000	υ	79000	U	49000	U	8100	υ
Dibenzofuran	ug/kg	1600	Ū	430	U	1100	Ú	49000	บ	16000	U	10000	U	1700	U
2,4-Dinitrotoluene	ug/kg	1600	Ü	430	U	1100	υ	49000	U	16000	υ	10000	U	1700	υ

SAMPLE LOCATION:		GL-SS-SA	A:2	GL-SS-SN	A-2	GL-95-9	M-3	GL-SS-S	M-3	GL-SS-S	M-3	GL SS SM		GL-SS-S	M-3
DEPTH:		17-19		23'-25'	•	5.7	•	157-17	7	17:-19) ^r	17 19) [*]	211-2	3.
DATE COLLECTED:		4/10/9	6	4/10/9	6	4/11/	96	4/11/	96	4/11/9	96	4/11/	96	4/11/	46
MOISTURE CONTENT:		15.7		24 1		40 0	1	196		19 1		187		212	
MATRIX:		SOLID)	SOLID)	SOLI	D	SOLI	D	SOLI	D	SOLI	D	SOLI	D
ANALYTE	UNITS												<u> </u>		
Dethyl phthalate	ug/kg	1600	U	430	U	1100	U	49000	U	16000	U	10000	บ	1700	U
4 Chlorophenyl phenyl ether	ug/kg	1600	U	430	U	1100	υ	49000	υ	16000	U	10000	U	1700	U
Fluorene	ug/kg	1600	U	430	U	1100	U	49000	U	16000	U	10000	U	1700	U
4 Nitroaniline	ug/kg	7600	U	2100	υ	5300	υ	240000	U	79000	U	49000	U	8100	U
4.6-Dinitro-2-methylphenol	ug/kg	7600	U	2100	U	5300	U)	240000	U	79000	υ	49000	υ	8100	U
N-Nitrosodiphenylamine	ug/kg	1600	U	430	U	1100	U	49000	U	16000	น	10000	U	1700	U
4-Bromophenyl phenyl ether	ug/kg	1600	U	430	U	1100	U	49000	U	16000	υ	10000	U	1700	IJ
Hexachlorobenzene	ug/kg	1600	U	4.30	υ	1100	U	49000	U	16000	U	10000	U	1700	U
Pentachlorophenol	ug/kg	7600	U	2100	U	5300	UJ	240000	U	79000	U	490(X)	U	8100	U
Phenanthrene	ug/kg	1600	U	4.30	U	190	1	8200	3	1600	J	10000	U	490	J
Anthracene	ug/kg	1600	U	430	U	1100	U	49000	U	16000	U	10000	U	1700	U
Carbazole	ug/kg	1600	U	4.30	U	1100	U	49000	U	16000	U	10000	U	1700	U
Di n butyl phthalate	ug/kg	1600	U	430	บ	1100	U	49000	U	16000	U	10000	U	1700	U
Fluoranthene	ug/kg	1600	U	430	υ	1100	U	49000	U	16000	U	10000	U	1700	U
Pyrene	ug/kg	1600	U	430	U	120	J	49000	U	16000	U	10000	U	1700	U
Butyl benzyl phthalate	ug/kg	550	J	120	J	1100	U	49000	U	16000	U	10000	U	1700	U
3,3' Dichlorobenzidine	ug/kg	7600	υ	2100	U	5300	U	240000	U	79000	υ	49000	U	8100	U
Benzo(a)anthracene	ug/kg	1600	U	4.30	U	1100	U	49000	U	16000	U	10000	U	1700	U
Chrysene	ug/kg	1600	U	430	U	1100	U	49000	U	16000	U	10000	U	1700	U
bis(2 Ethylhexyl) phthalate	ug/kg	1200	J	270	J	4900		82000		17000	J	7100	ĵ	6400	
Di-n-octyl phthalate	ug/kg	1600	U	430	U	1100	U	49000	U	16000	U	10000	U	1700	U
Benzo(b)fluoranthene	ug/kg	1600	U	430	U	1100	U	49000	U	16000	U	10000	U	1700	U
Benzo(k)fluoranthene	ug/kg	1600	U	430	U	1100	υ	49000	U	16000	U	10000	U	1700	U
Benzo(a)pyrene	ug/kg	1600	υ	430	U	1100	U	49000	U	16000	υ	10000	U	1700	U
Indeno(1,2,3-cd)pyrene	ug/kg	1600	U	430	U	1100	U	49000	U	16000	U	10000	U	1700	U
Dibenz(a,h)anthracene	ug/kg	1600	U	430	U	1100	U	49000	U	16000	U	10000	U	1700	U
Benzo(ghi)perylene	•	1600	U	430	υ	1100	U	49000	U	16000	U	10000	U	1700	U
• •	ug/kg				-		-		_	l .	U	10000	U	1	700

J - This result should be considered a quantitative estimate.

UJ - This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate.



B. This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration.

U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

et Compound List Sen atile Organic Compound Soil Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-SS-SN	1-4	GL-SS-SI	M-4	GL-SS-S	M-4	GL-SS-S	M-4	GL-SS-S	M-5	GL-SS-SM-	5 DUP
DEPTH:		5'-7	-	15'-17		19'-21		21'-2		5'-7'		5'-7'	
DATE COLLECTED:		4/11/9	6	4/11/9		4/11/9		4/11/		4/10/		4/10/9	96
MOISTURE CONTENT:		25.0		18.1		21.3		18.2		14.1	,,	13.5	,,,
MATRIX:		SOLID	,	SOLII	,	SOLI	,	SOLI		SOLII	D	SOLI)
ANALYTE	UNITS								-				
Phenol	ug/kg	49000	В	1600	บ	380	В	400	ับ	26000	ī	50000	ī
bis(2-Chloroethyl) ether	ug/kg	260000	บ	1600	Ū	2100	υ	400	U	31000	ΰ	76000	Ú
2-Chlorophenol	ug/kg	260000	Ü	1600	υ	2100	บ	400	Ü	31000	U	76000	Ū
1.3-Dichlorobenzene	ug/kg	260000	บ	1600	Ū	2100	Ü	400	Ū	31000	Ū	76000	Ū
1.4-Dichlorobenzene	ug/kg	260000	Ü	1600	Ū	2100	Ü	400	Ü	31000	Ū	76000	Ū
1.2-Dichlorobenzene	ug/kg	260000	Ü	1600	Ü	2100	บ	400	Ü	31000	υ	15000	j
2-Methylphenol	ug/kg	260000	U	1600	Ü	2100	Ü	400	Ū	31000	Ū	76000	Ú
2,2'-Oxybis(1-Chloropropane)	ug/kg	260000	U	1600	υ	2100	ับ	400	U	31000	U	76000	U
4-Methylphenol	ug/kg	260000	U	1600	Ū	2100	Ü	400	υ	31000	U	76000	U
N-Nitrosodi-n-propylamine	ug/kg	260000	U	1600	Ū	2100	Ū	400	Ü	31000	U	76000	Ü
Hexachloroethane	ug/kg	260000	U	1600	U	2100	υ	400	Ū	31000	U	76000	U
Nitrobenzene	ug/kg	260000	U	1600	บ	2100	υ	400	υ	31000	υ	76000	υ
Isophorone	ug/kg	260000	U	3200		220	J	400	U	31000	U	76000	U
2-Nitrophenol	ug/kg	260000	υ	1600	υ	2100	Ú	400	U	31000	U	76000	U
2,4-Dimethylphenol	ug/kg	260000	U	1300	ī	2100	U	400	υ	31000	υ	76000	υ
bis(2-Chloroethoxy)methane	ug/kg	260000	υ	1600	Ú	2100	υ	400	υ	31000	U	76000	U
2,4-Dichlorophenol	ug/kg	260000	ប	1600	U	2100	υ	400	υ	31000	U	76000	บ
1,2,4-Trichlorobenzene	ug/kg	260000	บ	1600	บ	2100	ប	400	บ	31000	U	76000	υ
Naphthalene	ug/kg	260000	υ	420	J	620	J	400	U	6100	j	32000	J
4-Chloroaniline	ug/kg	260000	U	1600	υ	2100	Ü	400	U	31000	U	76000	U
Hexachlorobutadiene	ug/kg	260000	บ	1600	ับ	2100	ប	400	U	31000	U	76000	U
4-Chloro-3-methylphenol	ug/kg	260000	υ	1600	υ	2100	υ	400	U	31000	U	76000	U
2-Methylnaphthalene	ug/kg	260000	U	1600	υ	2100	U	400	U	22000	J	78000	J
Hexachlorocyclopentadiene	ug/kg	1300000	ប	7800	U	10000	U	2000	U	150000	บ	370000	U
2,4,6-Trichlorophenol	ug/kg	260000	υ	1600	ับ	2100	υ	400	υ	31000	Ų	76000	U
2,4,5-Trichlorophenol	ug/kg	260000	U	1600	υ	2100	U	400	υ	31000	U	76000	U
2-Chloronaphthalene	ug/kg	260000	U	1600	บ	2100	υ	400	U	31000	U	76000	υ
2-Nitroaniline	ug/kg	1300000	υ	7800	U	10000	U	2000	U	150000	U	370000	U
Dimethyl phthalate	ug/kg	260000	U	1600	U	2100	ប	400	U	31000	U	76000	U
Acenaphthylene	ug/kg	260000	υ	1600	υ	2100	U	400	U	31000	U	76000	U
2,6-Dinitrotoluene	ug/kg	260000	U	1600	U	2100	U	400	U	31000	υ	76000	U
3-Nitroaniline	ug/kg	1300000	U.	7800	U	10000	U	2000	U	150000	U	370000	υ
Acenaphthene	ug/kg	260000	ប	1600	U	2100	U	400	U	31000	υ	76000	U
2,4-Dinitrophenol	ug/kg	1300000	U	7800	υ	10000	υ	2000	U	150000	ប	370000	U
4-Nitrophenol	ug/kg	1300000	U	7800	U	10000	υ	2000	U	150000	U	370000	U
Dibenzofuran	ug/kg	260000	U	1600	U	2100	U	400	U	31000	υ	76000	U
2,4-Dinitrotoluene	ug/kg	260000	U	1600	U	2100	U	400	U	31000	U	76000	U_

Target Compound List Sei Jatile Organic Compounds Soil Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-56-5	M·4	GL-SS-S	M-4	GL:98-S	M·4	GL-58-8	M-4	GL-SS-SI	4.5	GL-SS-SM-5	5 DUP
DEPTH:		5.7		151-12	7	19:-21		211-23	y	5'-7'		5:-7	
DATE COLLECTED:		4/11/9	26	4/11/	96	4/11/9	26	4/11/9	96	4/10/9	6	4/10/9	М.
MOISTURE CONTENT:		25 0		18 1		21.3		182	i	14.1		13.5	
MATRIX:		SOLI)	SOLI	D	SOLI)	SOLI	D	SOLID)	SOLIU)
ANALYTE	UNITS		-										
Diethyl phthalate	ug/kg	260000	U	1600	U	2100	υ	400	υ	31000	U	76000	U
4-Chlorophenyl phenyl ether	ug/kg	260000	U	1600	U	2100	υ	400	υ	31000	U	76000	U
Fluorene	ug/kg	260000	U	1600	U	2100	U	400	U	31000	u	76000	u
4 Nitroaniline	ug/kg	1300000	U	7800	U	10000	U	2000	U	150000	U	370000	U
4,6-Dinitro-2-methylphenol	ug/kg	1300000	U	7800	U	10000	U	2000	U	150000	U	370000	U
N-Nitrosodiphenylamine	ug/kg	260000	U	1600	บ	2100	U	400	u	31000	υ	76000	u
4 Bromophenyl phenyl ether	ug/kg	260000	U	1600	U	2100	U	400	U	31000	U	76000	U
Hexachlorobenzene	ug/kg	260000	U	1600	U	2100	U	400	U	31000	U	76000	U
Pentachlorophenol	ug/kg	1300000	υ	7800	U	10000	υ	2000	υ	150000	U	170000	U
Phenanthrene	ug/kg	260000	υ	1600	U	2100	υ	400	υ	4700	J	16000	J
Anthracene	ug/kg	260000	υ	1600	U	2100	U	400	υ	31000	U	76000	U
Carbazole	ug/kg	260000	U	1600	υ	2100	U	400	U	31000	U	76000	U
Di ii butyl phthalate	ug/kg	260000	U	440	J	470	1	400	υ	31000	U	76000	U
Fluoranthene	ug/kg	260000	U	1600	U	2100	υ	400	υ	31000	U	76000	U
Pyrene	ug/kg	260000	U	1600	U	2100	U	400	U	31000	U	76000	U
Butyl benzyl phthalate	ug/kg	260000	U	1000	J	1300	J	72	- 1	31000	U	76000	U
3,3 Dichlorobenzidine	ug/kg	1300000	U	7800	U	10000	U	2000	υ	150000	U	170000	U
Benzo(a)anthracene	ug/kg	260000	U	1600	U	2100	U	400	υ	31000	υ	76000	υ
Chrysene	ug/kg	260000	υ	1600	U	2100	U	400	υ	31000	U	76000	υ
bis(2-Ethylhexyl) phthalate	ug/kg	1300000		11000		17000		2700		21000	J	64000	J
Di n-octyl phthalate	ug/kg	260000	U	1600	U	430	J	400	υ	31000	U	76000	υ
Benzo(b)fluoranthene	ug/kg	260000	U	1600	U	2100	U	400	υ	31000	U	76000	U
Benzo(k)fluoranthene	ug/kg	260000	U	1600	U	2100	υ	400	υ	31000	U	76000	U
Benzo(a)pyrene	ug/kg	260000	U	1600	U	2100	U	400	υ·	31000	U	76000	U
Indeno(1,2,3-cd)pyrene	ug/kg	260000	υ	1600	U	2100	U	400	υ	31000	U	76000	υ
Dibenz(a,h)anthracene	ug/kg	260000	υ	1600	υ	2100	U	400	υ	31000	บ	76000	U
Benzo(ghi)perylene	ug/kg	260000	υ	1600	U	2100	U	400	υ	31000	U	76000	U

- J. This result should be considered a quantitative estimate.
- B. This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration.
- U This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.
- U) This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate.



set Compound List Sens atile Organic Compounds Soil Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-SS-SM-5	GL-SS-SM-5	GL-SS-SM-5	GL-SS-SM-6	GL-SS-SM-6	GL-SS-SM-6
DEPTH:	i	11'-13'	15'-17'	20'-22'	5'-7'	11'-13'	15'-17'
DATE COLLECTED:		4/10/96	4/10/96	4/10/96	4/10/96	4/10/96	4/10/96
MOISTURE CONTENT:		18.4	22.1	21.0	19.0	20.3	18.3
MATRIX:	'	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
ANALYTE	UNITS				30210		- JOELD
Phenol	ug/kg	64000	680	390 [65000	67000	11000
bis(2-Chloroethyl) ether	ug/kg	13000 U	420 U	420 U	14000 U	14000 U	1600 U
2-Chlorophenol	ug/kg	13000 U	420 U	420 U	14000 U	14000 U	1600 U
1.3-Dichlorobenzene	ug/kg	13000 U	420 U	420 U	14000 U	14000 U	1600 U
1.4-Dichlorobenzene	ug/kg	13000 U	420 U	420 U	14000 U	14000 U	1600 U
1,2-Dichlorobenzene	ug/kg	13000 U	420 U	420 U	14000 U	14000 U	1600 U
2-Methylphenol	ug/kg	13000 U	420 U	420 U	14000 U	14000 U	1600 U
2,2'-Oxybis(1-Chloropropane)	ug/kg	13000 U	420 U	420 U	14000 U	14000 U	1600 U
4-Methylphenol	ug/kg	13000 U	420 U	420 U	14000 U	14000 U	190 J
N-Nitrosodi-n-propylamine	ug/kg	13000 U	420 U	420 U	14000 U	14000 U	1600 U
Hexachloroethane	ug/kg	13000 ປ	420 U	420 U	14000 U	14000 U	1600 U
Nitrobenzene	ug/kg	13000 U	· 420 U	420 U	14000 U	14000 ป	1600 U
Isophorone	ug/kg	13000 U	420 U	420 U	14000 U	14000 U	1600 U
2-Nitrophenol	ug/kg	13000 U	420 U	420 U	14000 U	14000 U	1600 U
2,4-Dimethylphenol	ug/kg	13000 U	420 U	420 U	14000 U	14000 U	1600 U
bis(2-Chloroethoxy)methane	ug/kg	13000 U	420 U	420 U	14000 U	14000 U	1600 U
2,4-Dichlorophenol	ug/kg	13000 ປ	420 U	420 U	14000 U	14000 U	1600 U
1,2,4-Trichlorobenzene	ug/kg	13000 U	420 U	420 U	14000 U	14000 U	1600 U
Naphthalene	ug/kg	13000 U	420 U	420 U	14000 U	14000 U	1600 U
4-Chloroaniline	ug/kg	13000 U	420 U	420 U	14000 U	14000 U	1600 U
Hexachlorobutadiene	ug/kg	13000 U	420 U	420 U	14000 U	14000 U	1600 U
4-Chloro-3-methylphenol	ug/kg	13000 U	420 U	420 U	14000 U	14000 U	1600 U
2-Methylnaphthalene	ug/kg	13000 ປ	420 U	420 U	14000 U	14000 U	1600 U
Hexachlorocyclopentadiene	ug/kg	65000 U	2100 U	2000 U	66000 U	67000 U	7800 U
2,4,6-Trichlorophenol	ug/kg	13000 U	420 U	420 U] 14000 U	14000 U	1600 U
2,4,5-Trichlorophenol	ug/kg	13000 ປ	420 U	420 U	14000 U	14000 U	1600 U
2-Chloronaphthalene	ug/kg	່ 13000 ປ	420 U	420 U	14000 U	[14000 U	1600 U
2-Nitroaniline	ug/kg	65000 บ	2100 U	2000 U	66000 U	67000 U	7800 U
Dimethyl phthalate	ug/kg	13000 U	420 U	420 U	14000 U	14000 U	1600 U
Acenaphthylene	ug/kg	13000 U	420 U	420 U	14000 U	14000 U	1600 U
2,6-Dinitrotoluene	ug/kg	13000 U	420 U	420 U	14000 U	14000 U	1600 U
3-Nitroaniline	ug/kg	65000 U	2100 U	2000 U	66000 U	67000 U	7800 U
Acenaphthene	ug/kg	13000 U	420 U	420 U	14000 U	14000 U	1600 U
2,4-Dinitrophenol	ug/kg	65000 บ	2100 U	2000 U	66000 U	67000 U	7800 U
4-Nitrophenol	ug/kg	65000 U	2100 U	2000 U	66000 U	67000 U	7800 U
Dibenzofuran	ug/kg	13000 U	420 U	420 U	14000 U	14000 U	1600 U
2,4-Dinitrotoluene	ug/kg	13000 U	420 U	420 U	14000 U	14000 U	1600 U

Target Compound List Sen /atile Organic Compounds Soil Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-SS-SN	4.5	GL SS-SA	A·5	GL-SS-SI	M-5	GL-SS-SI	M·6	GL-98-SI	4.6	GUSS-SI	M-6
DEPTH:	1	11'-13'	•	15'-17'		20'-22	•	5.7		111-13	.	1517	
DATE COLLECTED:	ł	4/10/9	6	4/10/9	6	4/10/9	16	4/10/9	36	4/10/9	ا ه	4/10/9	26
MOISTURE CONTENT:		18.4		22 1		21.0		19.0		20 3		18.3	
MATRIX:		SOLID		SOLID)	SOLI)	SOLIT		SOLIE)	SOLIL)
ANALYTE	UNITS												
Diethyl phthalate	ug/kg	13000	U	420	U	420	U	14000	U	14000	υ	1600	U
Chlorophenyl phenyl ether	ug/kg	13000	υ	420	U	420	U	14000	υ	14000	υ	1600	u
Fluorene	ug/kg	13000	υ	420	U	420	U	14000	υ	14000	υ	1600	U
4 Nitroaniline	ug/kg	65000	U	2100	u	2000	บ	66000	υ	67000	υİ	7800	U
4,6-Dunitro-2-methylphenol	ug/kg	65000	U	2100	υ	2000	Ü	66000	U	67000	U	7800	U
N-Nitrosodiphenylamine	ug/kg	13000	Ū	420	Ū	420	Ū	14000	Ü	14000	Ū	1600	U
f Bromophenyl phenyl ether	ug/kg	13000	U	420	U	420	Ü	14000	υ	14000	υΙ	1600	u
Hexachlorobenzene	ug/kg	13000	U	420	U	420	U	14000	U	14000	u l	1600	U
Pentachlorophenol	ug/kg	65000	Ü	2100	υ	2000	Ü	66000	υ	67000	υ	7NOO	U
Phenanthrene	ug/kg	13000	U	420	υ	420	υ	14000	υ	14000	υ	1600	U
Anthracene	ug/kg	13000	U	420	υ	420	U	14000	υ	14000	υ	1600	U
Carbazole	ug/kg	13000	U	420	U	420	υ	14000	υ	14000	υ	1600	U
Di n butyl phthalate	ug/kg	13000	U	420	υ	420	υ	14000	υ	14000	U	1600	U
Fluoranthene	ug/kg	13000	U	420	υ	420	υ	14000	υ	14000	υ	1600	U
Pyrene	ug/kg	13000	U	420	υ	420	υ	14000	υ	14000	υ	1600	U
Butyl benzyl phthalate	ug/kg	13000	U	420	U	420	υ	14000	U	14000	υ	1600	υ
3,3' Dichlorobenzidine	ug/kg	65000	υ	2100	U	2000	υ	66000	υ	67000	U	7800	U
llenzo(a)anthracene	ug/kg	13000	U	420	U	420	U	14000	U	14000	υ	1600	U
Chrysene	ug/kg	13000	U	420	U	420	U	14000	U	14000	υ	1600	U
bis(2 Ethylhexyl) phthalate	ug/kg	13000	U	880		90	В	33000		14000	υ	990	1
Di-n-octyl phthalate	ug/kg	13000	υ	420	υ	420	υ	14000	U	14000	U	1600	U
Henzo(b)fluoranthene	ug/kg	13000	U	420	U	420	U	14000	U	14000	υ	1600	U
Benzo(k)fluoranthene	ug/kg	13000	υ	420	U	420	U	14000	U	14000	υ	1600	U
Benzo(a)pyrene	ug/kg	13000	Ū	420	Ü	420	Ü	14000	U	14000	υ	1600	U
Indeno(1,2,3-cd)pyrene	ug/kg	13000	Ū	420	U	420	Ū	14000	U	14000	υ	1600	U
Dibenz(a,h)anthracene	ug/kg	13000	Ū	420	U	420	Ū	14000	U	14000	υ	1600	υ
Benzo(ghi)perylene	ug/kg	13000	Ü	420	Ū	420	Ü	14000	Ü	14000	υΙ	1600	U

J - This result should be considered a quantitative estimate.

Approved for Quality

Assurance Release by:

Rev. O

Date 4/49

File SVOAs/Sol/Combined 6/11/96

B. This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration.

U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

UJ - This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate.

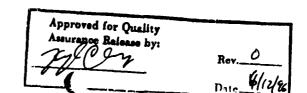
2t Compound List Sen Atile Organic Compoun Soil Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-SS-SM	1-6	GL-SS-S	M-7	GL-SS-S	M-7	GL-SS-S	M-7	GL-SS-SM-	7 DUP	GL-SS-S	M-7
DEPTH:		20'-22'		3'-5'		7-9		11'-1		11'-13		15'-17	
DATE COLLECTED:		4/10/9	6	4/11/	96	4/11/	96	4/11/		4/11/9	96	4/12/	96
MOISTURE CONTENT:		22.6		18.4		19.3		16.8	1	19.0	-	20.0	
MATRIX:		SOLID	,	SOLI	D	SOLI		sou		SOLII	o	SOLI	
ANALYTE	UNITS												
Phenol	ug/kg	2100		130000	J	45000		540	j ·	5500	J	3300	
bis(2-Chloroethyl) ether	ug/kg	430	υ	160000	U	8200	υ	400	Ü	810	Ü	410	U
2-Chlorophenol	ug/kg	430	υ	160000	υ	8200	U	400	υ	810	υ	410	U
1,3-Dichlorobenzene	ug/kg	430	υ	160000	υ	8200	υ	400	U	810	υ	410	U
1,4-Dichlorobenzene	ug/kg	430	υ	160000	U	8200	υ	400	U	810	υ	410	U
1,2-Dichlorobenzene	ug/kg	430	υ	31000	j	8200	U	400	υ	810	U	130	J
2-Methylphenol	ug/kg	430	U	160000	Ü	1900	J	400	บ	810	U	67	j
2,2'-Oxybis(1-Chloropropane)	ug/kg	430	บ	160000	υ	8200	Ü	400	U	810	U	410	U
4-Methylphenol	ug/kg	430	υ	160000	U	1400	J	400	U	810	บ	89	j
N-Nitrosodi-n-propylamine	ug/kg	430	υ	160000	υ	8200	U	400	U	810	U	410	U
Hexachloroethane	ug/kg	430	U	160000	U	8200	U	400	U	810	U	410	U
Nitrobenzene	ug/kg	430	ប	160000	υ	8200	U	400	υ	810	U	410	U
Isophorone	ug/kg	430	U	160000	υ	8200	υ	400	U	810	U	410	U
2-Nitrophenol	ug/kg	430	U	160000	U	8200	U	400	U	810	U	410	U
2,4-Dimethylphenol	ug/kg	430	υ	160000	U	1200	J	400	U	810	υ	410	U
bis(2-Chloroethoxy)methane	ug/kg	430	υ	160000	U	8200	U	400	U	810	บ	410	υ
2,4-Dichlorophenol	ug/kg	430	บ	160000	U	8200	U	400	U	810	U	410	U
1,2,4-Trichlorobenzene	ug/kg	430	U	42000	J	8200	U	400	U	810	U	140	j
Naphthalene	ug/kg	430	ប	160000	U	8200	U	400	U	810	U	100	J
4-Chloroaniline	ug/kg	430	U	160000	U	8200	ប	400	U	810	U	410	Ü
Hexachlorobutadiene	ug/kg	430	บ	160000	U	8200	U	400	U	810	ប	410	U
4-Chloro-3-methylphenol	ug/kg	430	บ	160000	U	8200	U	400	U	810	υ	410	U
2-Methylnaphthalene	ug/kg	430	U	18000	J	8200	U	400	U	810	U.	210	j
Hexachlorocyclopentadiene	ug/kg	2100	υ	780000	U	40000	บ	1900	U	3900	U	2000	U
2,4,6-Trichlorophenol	ug/kg	430	U	160000	U .	8200	U	400	U	810	U	410	υ
2,4,5-Trichlorophenol	ug/kg	430	บ	160000	υ	8200	U	400	U	810	U	410	U
2-Chloronaphthalene	ug/kg	430	บ	160000	U	8200	υ	400	บ	810	U	410	U
2-Nitroaniline	ug/kg	2100	บ	780000	บ	40000	U	1900	υ	3900	U	2000	υ
Dimethyl phthalate	ug/kg	430	U	160000	U	8200	U	400	U	810	U	410	U
Acenaphthylene	ug/kg	430	บ	160000	υ	8200	U	400	U	810	U	410	บ
2,6-Dinitrotoluene	ug/kg	430	U	160000	U	8200	U	400	U	810	U	410	U
3-Nitroaniline	ug/kg	2100	U	780000	U	40000	U	1900	υ	3900	U	2000	υ
Acenaphthene	ug/kg	430	U	160000	U	8200	U	400	U	810	U	410	U
2,4-Dinitrophenol	ug/kg	2100	U	780000	Ü	40000	U	1900	U	3900	U	2000	υ
4-Nitrophenol	ug/kg	2100	U	780000	U	40000	U	1900	U	3900	U	2000	U
Dibenzofuran	ug/kg	430	U	160000	U	8200	U	400	U	810	U	410	υ
2,4-Dinitrotoluene	ug/kg	430	U	160000	U	8200	U	400	U	810	U	410	_บ

Target Compound List Seis. Jatile Organic Compounds Soil Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:	- 1	G1:55-58	M-6	GL-SS-S	M-7	GL-SS-SI	M-7	GL-SS-S	M·7	GL-SS-SM-	7 DUP	GI-SS-S	M-7
DEPTH:		20'-22	•	3'-5'		7'.9'		11 -13	r	11/43) ^r	15'-17	7
DATE COLLECTED:		4/10/9	46	4/11/	96	4/11/9	ж	4/11/9	76	4/11/	96	4/12/	46
MOISTURE CONTENT:	[22.6		184		19.3	ſ	16 8		140		20 0	
MATRIX:	1	SOLID)	SOLI	D	SOLI)	SOLI)	SOLI	o c	SOLI	บ
ANALYTE	UNITS			1			`						_
1 Hethyl phthalate	ug/kg	430	U	160000	U	8200	U	400	U	810	U	410	υ
4 Chlorophenyl phenyl ether	ug/kg	430	U	160000	บ	8200	U	400	U	610	U	410	υ
Fluorene	ug/kg	430	U	160000	U	8200	U	400	U	810	บ	410	U
4 Nitroaniline	ug/kg	2100	U	780000	U	40000	U	1900	U	3900	u	2000	IJ
4,6-Dinitro-2-methylphenol	ug/kg	2100	U	780000	U	40000	υ	1900	U	.3900	U	2000	U
N-Nitrosodiphenylamine	ug/kg	430	U	160000	U	6200	U	400	U	810	U	410	u
4 Bromophenyl phenyl ether	ug/kg	430	υ	160000	U	8200	U	400	U	810	U	410	U
Hexachlorobenzene	ug/kg	430	U	160000	U	8200	υ	400	U	810	U	410	U
l'entachlorophenol	ug/kg	2100	U	780000	U	40000	U	1900	u	3900	U	2000	U
Phenanthrene	ug/kg	430	υ	160000	υ	8200	υl	400	U	810	U	57	J
Anthracene	ug/kg	430	U	160000	U	8200	U	400	U	810	U	410	U
Carbazole	ug/kg	430	U	160000	U	8200	υ	400	U	810	υ	410	υ
Di-n-butyl phthalate	ug/kg	430	U	160000	U	8200	U	400	U	810	U	410	U
Fluoranthene	ug/kg	430	U	160000	U	8200	U	400	U	810	U	410	U
Pyrene	ug/kg	430	υ	160000	U	8200	U	400	U	810	υ	410	U
Butyl benzyl phthalate	ug/kg	430	U	160000	U	8200	υ	400	U	810	υ	410	U
3.3' Dichlorobenzidine	ug/kg	2100	U	780000	υ	40000	U	1900	U	3900	U	2000	U
Henzo(a)anthracene	ug/kg	430	U	160000	U	8200	υ	400	U	810	U	410	U
Chrysene	ug/kg	430	U	160000	υ	8200	U	400	U	810	U	410	U
bis(2 Ethylhexyl) phthalate	ug/kg	180	1	720000		8200	U	1900		1500		3200	
Di-n-octyl phthalate	ug/kg	430	υ	160000	U	8200	υ	400	U	810	U	410	U
Benzo(b)fluoranthene	ug/kg	430	U	160000	U	8200	U	400	U	810	U	410	U
Benzo(k)fluoranthene	ug/kg	430	υ	160000	υ	8200	U	400	U	810	U	410	U
Henzo(a)pyrene	ug/kg	430	υ	160000	U	8200	U	400	U	810	U	410	U
Indeno(1,2,3-cd)pyrene	ug/kg	430	U	160000	U	8200	υ	400	U	810	U	410	U
Dibenz(a,h)anthracene	ug/kg	430	U	160000	υ	8200	U	400	U	E10	U	410	บ
Benzo(ghi)perylene	ug/kg	430	U	160000	u	8200	U	400	U	810	U	410	U

- J This result should be considered a quantitative estimate.
- B This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration.
- U This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.
- UJ This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate.



File SVOAs/Soil/Combined 6/11/96

A.get Compound List Sen. Jatile Organic Compounds Soil Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-SS-S	M-8	GL-SS-S	SM-8	GL-SS-S	M-8	GL-SS-S	M-8	GL-SS-S	VI-8	GL-SS-S	M-9
DEPTH:		0'-1'		3'-5		7'-9'		11'-1		15'-17		4'-6'	
DATE COLLECTED:		4/11/	96	4/11/		4/11/		4/11/		4/11/9	6	4/12/	
MOISTURE CONTENT:		17.6		15.9		15.4		16.9		18.4		18.4	_
MATRIX:		SOLI		SOLI		SOLI		SOLI		SOLII)	SOLI	
ANALYTE	UNITS						•						
Phenol	ug/kg	430000	,	330000	J :	250000	В	53000		2500		400	U
bis(2-Chloroethyl) ether	ug/kg	560000	Ú	390000	Ú	390000	υ	400	U	400	U	400	U
2-Chlorophenol	ug/kg	560000	U	390000	U	390000	υ	130	j	400	บ	400	บ
1,3-Dichlorobenzene	ug/kg	560000	υ	390000	υ	390000	υ	400	ΰ	400	υ	400	U
1,4-Dichlorobenzene	ug/kg	91000	j	390000	บ	390000	U	400	υ	400	U	400	υ
1,2-Dichlorobenzene	ug/kg	230000	J	390000	U	390000	υ	52	J	400	U	400	U
2-Methylphenol	ug/kg	560000	ΰ	390000	U	390000	υ	540	•	400	U	400	U
2,2'-Oxybis(1-Chloropropane)	ug/kg	560000	U	390000	U	390000	υ	400	U	400	U	400	U
4-Methylphenol	ug/kg	560000	U	390000	U	390000	U	460		400	Ü	400	U
N-Nitrosodi-n-propylamine	ug/kg	560000	U	390000	U	390000	U	400	U	400	U	400	U
Hexachloroethane	ug/kg	560000	υ	390000	U	390000	U	400	U	400	U	400	υ
Nitrobenzene	ug/kg	560000	υ	390000	U	390000	υ	400	U	400	U	400	บ
Isophorone	ug/kg	560000	U	390000	U	390000	U	48	J	400	บ	400	υ
2-Nitrophenol	ug/kg	560000	U	390000	U	390000	U	400	U	400	U	400	U
2,4-Dimethylphenol	ug/kg	560000	U	390000	U	390000	U	400	U	400	U	400	υ
bis(2-Chloroethoxy)methane	ug/kg	560000	υ	390000	U	390000	U	400	U	400	U	400	U
2,4-Dichlorophenol	ug/kg	560000	U	390000	U	390000	U	400	υ	400	U	400	U
1,2,4-Trichlorobenzene	ug/kg	350000	J	390000	U	390000	ប	60	J	400	U	400	U
Naphthalene	ug/kg	86000	j	390000	υ	390000	บ	400	U	400	U	400	U
4-Chloroaniline	ug/kg	560000	U	390000	υ	390000	U	400	U	400	บ	400	Ü
Hexachlorobutadiene	ug/kg	560000	U	390000	U	390000	υ	400	บ	400	U	400	U
4-Chloro-3-methylphenol	ug/kg	560000	U	390000	U	390000	U	400	U	400	U	400	U
2-Methylnaphthalene	ug/kg	130000	J	390000	U	390000	υ	400	U	400	U	400	U
Hexachlorocyclopentadiene	ug/kg	2700000	U	1900000	U	1900000	U	1900	U	2000	U	2000	U
2,4,6-Trichlorophenol	ug/kg	560000	U ×	390000	U	390000	U	400	U	400	U	400	บ
2,4,5-Trichlorophenol	ug/kg	560000	U	390000	U	390000	บ	400	U	400	U	400	U
2-Chloronaphthalene	ug/kg	560000	U	390000	U	390000	U	400	U	400	U	400	U
2-Nitroaniline	ug/kg	2700000	U	1900000	U	1900000	U	1900	U	2000	U	2000	U
Dimethyl phthalate	ug/kg	560000	U	390000	U	390000	U	400	ប	400	υ	400	U
Acenaphthylene	ug/kg	560000	U	390000	U	390000	U	400	บ	400	U	400	U
2,6-Dinitrotoluene	ug/kg	560000	U	390000	U	390000	บ	400	U	400	U	400	U
3-Nitroaniline	ug/kg	2700000	U	1900000	U	1900000	U	1900	U	2000	U	2000	υ
Acenaphthene	ug/kg	560000	υ	390000	U	390000	U	400	U	400	U	400	U
2,4-Dinitrophenol	ug/kg	2700000	U	1900000	υ	1900000	U	1900	υ	2000	υ	2000	υ
4-Nitrophenol	ug/kg	2700000	υ	1900000	U	1900000	U	1900	U	2000	U	. 2000	υ
Dibenzofuran	ug/kg	560000	'n	390000	U	390000	U	400	U	400	U	400	U
2,4-Dinitrotoluene	ug/kg	560000	Ü	390000	U	390000	U	400	υ	400	U	400	บ_

Target Compound List Sei. datile Organic Compounds Soil Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-SS-S	M-8	GL-SS-S	M·8	GL-58-5	M-8	GL/SS/S	M-8	GL-98-SI	M-8	GL/SS/S	M.V
DEPTH:		01.		31-51		7.9		11/43	r	151-17	·	41.6	
DATE COLLECTED:		4/11/9	96	4/11/	96	4/11/	96	4/11/	96	4/11/9	16	4/12/9	46
MOISTURE CONTENT:		176		15 9		15 4	1	164		18 4	1	18 4	
MATRIX:		SOLI	D	SOLI	Þ	SOLI	D	SOLI	υİ	SOLIL	, [SOLI	D
ANALYTE	UNITS												
Pethyl phthalate	ug/kg	560000	U	390000	U	390000	υ	400	υ	400	U	400	U
4 Chlorophenyl phenyl ether	ug/kg	560000	U	390000	U	390000	U	400	υ	400	υ	400	U
Fluorene	ug/kg	560000	U	390000	U	390000	υ	400	U	400	U	400	U
4 Nitroaniline	ug/kg	2700000	υ	1900000	U	1900000	υ	1900	υ	2000	υ	2000	U
4,6 Dinitro-2-methylphenol	ug/kg	2700000	U	1900000	U	1900000	U	1900	U	2000	υ	2000	U
N-Nitrosodiphenylamine	ug/kg	560000	U	390000	U	390000	U	400	υ	400	υ	400	U
4 Bromophenyl phenyl ether	ug/kg	560000	υ	390000	U	390000	U	400	υ	400	U	400	U
tiexachiorobenzene	ug/kg	560000	U	390000	U	390000	υ	400	U	400	υļ	400	U
Pentachlorophenol	ug/kg	2700000	U	1900000	U	1900000	U	1900	U	2000	U	2000	u
Phenanthrene	ug/kg	560000	U	390000	U	390000	U	400	U	400	U	400	U
Anthracene	ug/kg	560000	U	390000	U	390000	U	400	U	400	U	400	U
Carbazole	ug/kg	560000	υ	390000	U	390000	U	400	υ	400	U	400	U
Di-n-butyl phthalate	ug/kg	560000	U	390000	U	390000	υ	400	U	400	υ	400	U
Fluoranthene	ug/kg	560000	U	390000	U	390000	υ	400	U	400	υ	400	U
Pyrene	ug/kg	560000	U	390000	U	390000	U	400	U	400	υļ	400	U
Butyl benzyl phthalate	ug/kg	560000	υ	390000	U	390000	U	400	U	400	U	400	U
3,3' Dichlorobenzidine	ug/kg	2700000	U	1900000	U	1900000	υ	1900	υ	2000	U	2000	U
Benzo(a)anthracene	ug/kg	560000	U	390000	U	390000	U	400	U	400	U	400	U
Chrysene	ug/kg	560000	υ	390000	U	390000	U	400	U	400	U	400	U
bis(2-Ethylhexyl) phthalate	ug/kg	4000000		2700000		2300000		2500	J	3600		1000	
Di-n-octyl phthalate	ug/kg	560000	U	390000	U	390000	U	400	υ	400	υ	400	U
Benzo(b)fluoranthene	ug/kg	560000	U	390000	U	390000	U	400	υ	400	U	400	U
Benzo(k)fluoranthene	ug/kg	560000	U	390000	υ	390000	υ	400	U,	400	U	400	U
Benzo(a)pyrene	ug/kg	560000	υ	390000	U	390000	U	400	U	400	υ	400	U
Indeno(1,2,3-cd)pyrene	ug/kg	560000	υ	390000	U	390000	U	400	υ	400	U	400	υ
Dibenz(a,h)anthracene	ug/kg	560000	U	390000	υ	390000	U	400	U	400	U	400	U
Benzo(ghi)perylene	ug/kg	560000	U	390000	U	390000	υ	400	U	400	U	400	U

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- B. This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration.
- U This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.
- UJ This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate.

Approved for Quality
Assurance Release by:

Rev.

Date 4/12/6

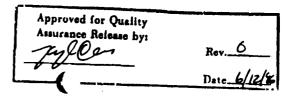
get Compound List Sen latile Organic Compounds Soil Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-SS-SM-	9 1	GL-SS-S	M-9	GL-SS-SN	√1-10	GL-SS-SI	M-10	GL-SS-SI	√ 1-10	GL-SS-9	5S
DEPTH:		6'-8'		12'-14	į'	4'-6'		6'-8'		12'-14	r .	0'-1'	
DATE COLLECTED:		4/12/96	- 1	4/12/9	96	4/12/9	96	4/12/	96	4/12/9	96	4/10/9	96
MOISTURE CONTENT:		18.9	- 1	20.0		19.1		16.2		20.9		20.3	
MATRIX:		SOLID		SOLII)	SOLII)	SOLI	D .	SOLII	0	SOLIE)
ANALYTE	UNITS												
Phenol	ug/kg	410	υ	410	U	410	U	390	U	420	U	170000	υ
bis(2-Chloroethyl) ether	ug/kg	410	υ	410	υ	410	ប	390	υ	420	υ	170000	U
2-Chlorophenol	ug/kg	410	บ	410	U.	410	U	390	U	420	U	170000	U
1,3-Dichlorobenzene	ug/kg	410	U	410	U	410	υ	390	U	420	บ	170000	U
1,4-Dichlorobenzene	ug/kg	410	บ	410	U	410	U	390	U	420	U	170000	U
1,2-Dichlorobenzene	ug/kg	410	บ	410	U	410	U	390	U	420	U	170000	U
2-Methylphenol	ug/kg	410	υ	410	υ	410	U	390	U	420	υ	170000	U
2,2'-Oxybis(1-Chloropropane)	ug/kg	410	υ	410	บ	410	U	390	U	420	U	170000	U
4-Methylphenol	ug/kg	410	U	410	υ	410	U	390	ប	420	U	170000	U
N-Nitrosodi-n-propylamine	ug/kg	410	υ	410	บ	410	U	390	U	420	ប	170000	υ
Hexachloroethane	ug/kg	410	U	410	U	410	บ	390	U	420	บ	170000	U
Nitrobenzene	ug/kg	410	U	410	υ	410	υ	390	U	420	U	170000	U
Isophorone	ug/kg	380	J	410	U	410	U [.]	390	U	420	U	170000	U
2-Nitrophenol	ug/kg	410	U	410	U	410	U	390	U	420	U	170000	U
2,4-Dimethylphenol	ug/kg	410	υ	410	U	410	U	390	U	420	U	170000	U
bis(2-Chloroethoxy)methane	ug/kg	410	U	410	U	410	U	390	ប	420	U	170000	U
2,4-Dichlorophenol	ug/kg	410	υ	410	U	410	υ	390	U	420	U	170000	U
1,2,4-Trichlorobenzene	ug/kg	410	υ	410	U	410	U	390	U	420	U	170000	U
Naphthalene	ug/kg	410	υ	410	U	410	U	390	U	420	U	170000	U
4-Chloroaniline	ug/kg	410	υ	410	U	410	U	390	U	420	Ü	170000	U
Hexachlorobutadiene	ug/kg	410	υ	410	υ	410	υ	390	U	420	U	1 <i>7</i> 0000	U
4-Chloro-3-methylphenol	ug/kg	410	υ	410	U	410	U	390	U	420	U	170000	U
2-Methylnaphthalene	ug/kg	410	υ	410	υ	410	U	390	U	420	U	170000	U
Hexachlorocyclopentadiene	ug/kg	2000	U	2000	U	2000	U	1900	บ	2000	U	800000	U
2,4,6-Trichlorophenol	ug/kg	410	U	410	U	410	U	390	U	420	U	170000	U
2,4,5-Trichlorophenol	ug/kg	410	U	410	U	410	U	390	U	420	U	170000	U
2-Chloronaphthalene	ug/kg	410	U	410	U	410	U	390	U	420	U	170000	U
2-Nitroaniline	ug/kg	2000	U	2000	U	2000	υ	1900	U	2000	U	800000	U
Dimethyl phthalate	ug/kg	410	υ	410	U	410	U	390	U	420	υ	170000	U
Acenaphthylene	ug/kg	410	υ	410	U	410	U	390	U	420	U	170000	U
2,6-Dinitrotoluene	ug/kg	410	U	410	U	410	U	390	υ	420	U	170000	U
3-Nitroaniline	ug/kg	2000	U	2000	U	2000	U	1900	U	2000	U	800000	U
Acenaphthene	ug/kg	410	U	410	U	410	U	390	U	420	U	170000	U
2,4-Dinitrophenol	ug/kg	2000	U	2000	U	2000	U	1900	U	2000	U	800000	บ
4-Nitrophenol	ug/kg	2000	U	2000	U	2000	U	1900	บ	2000	U	800000	U
Dibenzofuran	ug/kg	410	บ	410	U	410	U	390	U	420	U	170000	U
2,4-Dinitrotoluene	ug/kg	410	υ	410	υ	410	υ	390	U	420	U	170000	U

Target Compound List Sei. latile Organic Compounds Soil Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:	ł	GL-SS-S	M-9	GL: 5 8-S	M-9	GL-SS-SI	M-10	GL SS SI	M-10	GL-SS-SA	A-10	GF-98-9	55
DEPTH:		6'-8'		12'-14	r	4'-6'		6'-8'		12'-14		01,	
DATE COLLECTED:		4/12/9	26	4/12/	96	4/12/9	96	4/12/	96	4/12/9	76	4/10/9	16
MOISTURE CONTENT:		189		20 0		191	i	16.2		20.9		20.3	
MATRIX:		SOLII)	SOLI	D	SOLI	D	SOLI	D	SOLI)	SOLIL	נ
ANALYTE	UNITS		1			_							
Diethyl phthalate	ug/kg	410	U	410	υ	410	U	390	U	420	U	170000	U
4 Chlorophenyl phenyl ether	ug/kg	410	บ	410	บ	410	υ	390	U	420	U	170000	U
Fluorene	ug/kg	410	U	410	U	410	U	390	U	420	U	170000	U
4 Nitroaniline	ug/kg	2000	U	2000	U	2000	U	1900	U	2000	U	HOOOOO	U
4,6 Dinitro-2-methylphenol	ug/kg	2000	U	2000	u	2000	υ	1900	U	2000	U	800000	U
N-Nitrosodiphenylamine	ug/kg	410	U	410	U	410	U	390	U	420	U	170000	u
4 Bromophenyl phenyl ether	ug/kg	410	U	410	U	410	U	.390	U	420	U	170000	u
Hexachlorobenzene	ug/kg	410	υ	410	บ	410	U	390	U	420	U	170000	U
l'entachlorophenol	ug/kg	2000	υ	2000	U	2000	U	1900	U	2000	υ	наххх	U
I'henanthrene	ug/kg	410	υ	410	U	410	U	390	U	420	U	170000	U
Anthracene	ug/kg	410	υ	410	υ	410	U	390	U	420	U	170000	U
Carbazole	ug/kg	410	U	410	U	410	U	390	U	420	υ	170000	U
Di-n-butyl phthalate	ug/kg	410	υ	410	υ	410	U	390	U	420	U	36000	J
Fluoranthene	ug/kg	410	U	410	U	410	υ	390	υ	420	U	170000	U
l'yrene	ug/kg	410	υ	410	U	410	U	390	U	420	U	170000	U
Butyl benzyl phthalate	ug/kg	410	υ	410	υ	410	U	390	U	420	U	86000	J
3,3' Dichlorobenzidine	ug/kg	2000	U	2000	U	2000	U	1900	υ	2000	U	800000	U
Benzo(a)anthracene	ug/kg	410	U	410	U	410	U	390	U	420	U	170000	U
Chrysene	ug/kg	410	υ	410	υ	410	U	390	υ	420	U	170000	U
bis(2 Ethylhexyl) phthalate	ug/kg	480	i	350	;	1100		1400		460		870000	
Di-n-octyl phthalate	ug/kg	410	U	410	U	410	U	.390	U	420	U	170000	U
Benzo(b)fluoranthene	ug/kg	410	U	410	υ	410	U	390	U	420	υ	170000	U
Benzo(k)fluoranthene	ug/kg	410	υ	410	U	410	U	390	U	420	U	170000	υ
Benzo(a)pyrene	ug/kg	410	U	410	U	410	υ	390	U	420	υ	170000	U
Indeno(1,2,3-cd)pyrene	ug/kg	410	υ	410	U	410	U	390	U	420	U	170000	U
Dibenz(a,h)anthracene	ug/kg	410	U	410	U	410	U	390	υ	420	υ	170000	U
Benzo(ghi)perylene	ug/kg	410	U	410	υ	410	U	390	U	420	U	170000	υ

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- B. This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration.
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- UJ This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate.



Taget Compound List Sen Jatile Organic Compounds Aqueous Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-WS-SN	M-1	GL-WS-SM-	1 DUP	GL-WS-SI	M-4	GL-WS-SI	M-8	GL-WS-SI	M-9	
DEPTH:		N/A		N/A		N/A		N/A	1	N/A		
DATE COLLECTED:		4/9/96	,	4/9/96		4/11/96		4/11/96		4/12/9	6	
MOISTURE CONTENT:		N/A		N/A		N/A		N/A		N/A		
MATRIX:		WATER		WATER		WATER	. I	WATER		WATER		
ANALYTE	UNITS											
Phenol	ug/L	44000		44000		5800		320000		49	Ī	
bis(2-Chloroethyl) ether	ug/L	12000	υ	9800	υ	500	υ	80000	U	200	Ū	
2-Chlorophenol	ug/L	12000	U	9800	U	500	υ	80000	υ	200	U	
1,3-Dichlorobenzene	ug/L	12000	U	9800	υ	500	υ	80000	υ	200	U	
1,4-Dichlorobenzene	ug/L	12000	U	9800	บ	500	υ	80000	υ	200	U	
1,2-Dichlorobenzene	ug/L	12000	υ	9800	U	500	U	80000	บ	200	U	
2-Methylphenol	ug/L	12000	U	1200	J i	500	U	80000	υ	200	U	
2,2'-Oxybis(1-Chloropropane)	ug/L	12000	U	9800	Ü	500	U	80000	บ	200	U	
4-Methylphenol	ug/L	5100	J	5100	J	910		80000	U	200	Ü	
N-Nitrosodi-n-propylamine	ug/L	12000	υ	9800	υ	500	U	80000	U	200	U	
Hexachloroethane	ug/L	12000	υ	9800	υ	500	ប	80000	υ	200	U	
Nitrobenzene	ug/L	12000	U	9800	υ	500	U	80000	ប	200	U	
Isophorone	ug/L	12000	บ	9800	U	530		80000	υ	200	Ū	
2-Nitrophenol	ug/L	12000	U	9800	U	500	บ	80000	บ	200	U	
2,4-Dimethylphenol	ug/L	12000	ប	9800	U	500	Ü	80000	υ	200	U	
bis(2-Chloroethoxy)methane	ug/L	12000	บ	9800	U	500	U	80000	บ	200	Ū	
2,4-Dichlorophenol	ug/L	12000	U	9800	U	500	บ	80000	ប	200	U	
1,2,4-Trichlorobenzene	ug/L	12000	υ	9800	ប	500	U	80000	ប	200	U	
Naphthalene	ug/L	12000	U	9800	U	490	J	80000	υ	200	U	
4-Chloroaniline	ug/L	12000	บ	9800	U	500	U	80000	U	200	U	
Hexachlorobutadiene	ug/L	12000	U	9800	U	500	U	80000	ឋ	200	U	
4-Chloro-3-methylphenol	ug/L	12000	U	9800	U	500	U	80000	U.	200	U	
2-Methylnaphthalene	ug/L	12000	ប	9800	U	500	บ	80000	บ	200	U	
Hexachlorocyclopentadiene	ug/L	60000	บ	49000	U	2500	U	400000	ប	1000	บ	
2,4,6-Trichlorophenol	ug/L	12000	υ	9800	U	500	ប	80000	υ	200	U	
2,4,5-Trichlorophenol	ug/L	12000	U	9800	U	500	U	80000	U	200	บ	
2-Chloronaphthalene	ug/L	12000	U	9800	U	500	U	80000	บ	200	U	
2-Nitroaniline	ug/L	60000	U	49000	U	2500	U	400000	U	1000	U	
Dimethyl phthalate	ug/L	12000	U	9800	U	500	ប	80000	U	200	U	
Acenaphthylene	ug/L	12000	U	9800	U	500	U	80000	U	200	U	
2,6-Dinitrotoluene	ug/L	12000	U	9800	บ	500	U	80000	U	200	U	
3-Nitroaniline	ug/L	60000	U	49000	U	2500	U	400000	U	1000	υ	
Acenaphthene	ug/L	12000	U	9800	U	500	U	80000	U	200	υ	
2,4-Dinitrophenol	ug/L	60000	U	49000	υ	2500	υ	400000	Ü	1000	U	
4-Nitrophenol	ug/L	60000	U	49000	U	2500	U	400000	U	1000	U	
Dibenzofuran	ug/L	12000	U	9800	U	500	U	80000	U	200	ប	
2,4-Dinitrotoluene	ug/L	12000	Ū	9800	Ū	500	U	80000	U	200	U	

Target Compound List Seb. Aatile Organic Compounds Aqueous Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:	OCATION: GL-WS-SM-1		M-I	GL-WS-SM-	I DUP	GL-WS-SI	VI-4	GL-WS-S	M·8	GL-WS-SI	M:Q
DEPTH:	I	N/A		N/A		N/A		N/A		N/A	
DATE COLLECTED:		4/9/9	5	4/9/96		4/11/96		4/11/96		4/12/96	
MOISTURE CONTENT:		N/A		N/A		N/A		N/A		N/A	
MATRIX:	ŀ	WATE	R	WATER		WATER		WATER		WATER	
ANALYTE	UNITS										
Nethyl phthalate	ug/L	12000	U	9800	υ	500	υ	80000	U	200	u
Chlorophenyl phenyl ether	ug/L	12000	U	9800	υ	500	U	80000	U	200	U
fluorene	ug/L	12000	U	9800	υ	500	υ	80000	U	200	U
l Nitroaniline	ug/L	60000	U	49000	υ	2500	υ	400000	U	1000	U
I,6-Dinitro-2-methylphenol	ug/L	60000	U	49000	U	2500	U	400000	U	1000	U
Nitrosodiphenylamine	ug/L	12000	U	9800	U	500	U	80000	U	200	U
l-Bromophenyl phenyl ether	ug/L	12000	U	9800	υ	500	U	80000	U	200	U
lexachlorobenzene	ug/t.	12000	U	9800	U	500	U	80000	υ	200	υ
'entachlorophenol	ug/L	60000	U	49000	υ	2500	U	400000	U	1000	U
'henanthrene	ug/l.	12000	U	9800	υ	500	U	80000	U	200	U
Anthracene	ug/L	12000	U	9800	ឋ	500	U	80000	U	200	U
arbazole	ug/L	12000	U	9800	υ	500	U	80000	U	200	U
મં n butyl phthalate	ug/L	12000	U	9800	บ	500	U	80000	U	200	U
luoranthene	ug/L	12000	U	9800	U	500	U	80000	U	200	IJ
'yrene	ug/t.	12000	U	9800	U	500	U	80000	U	200	U
Butyl benzyl phthalate	ug/L	12000	U	9800	υ	500	υ	80000	U	200	U
1,3'-Dichlorobenzidine	ug/L	60000	U	49000	υ	2500	U	400000	U	1000	U
Jenzo(a)anthracene	ug/L	12000	U	9800	U	500	U	80000	U	200	U
Thrysene	ug/L	12000	U	9800	U	500	U	80000	U	200	U
is(2 Ethylhexyl) phthalate	ug/L	12000	U	4700	J	4100		80000	U	200	U
Di-n-octyl phthalate	ug/L	12000	U	9800	U	500	U	80000	U	200	U
enzo(b)fluoranthene	ug/L	12000	U	9800	U	500	U	80000	U	200	U
kenzo(k)fluoranthene	ug/L	12000	U	9600	U	500	U	80000	υ	200	U
lenzo(a)pyrene	ug/L	12000	U	9800	U	500	U	80000	U	200	U
ndeno(1,2,3-cd)pyrene	ug/L	12000	U	9800	U	500	U	80000	U	200	U
Dibenz(a,h)anthracene	ug/L	12000	υ	9800	U	500	U	80000	U	200	U
knzo(ghi)perylene	ug/L	12000	U	9800	U	500	U	80000	U	200	U

- J This result should be considered a quantitative estimate.
- B This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration.
- U This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.
- UJ This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate.

N/A - Not applicable.

* - This sample is an Equipment Rinsate Blank.

Approved for Quality
Assurance Release by:
Rev. O

Tay at Compound List Sen atile Organic Compounds Aqueous Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-WS-ER-	101*	GL-WS-ER	-102°	GL-WS-EF	R-103*	GL-WS-ER	-104*	
DEPTH:		N/A		N/A		N/A		N/A		
DATE COLLECTED:		4/9/96		4/10/9	6	4/11/9	96	4/11/96		
MOISTURE CONTENT:	ļ	N/A		N/A		N/A		N/A		
MATRIX:	j	WATER	ł l	WATE	R	WATE		WATER		
ANALYTE	UNITS	· · · · · · · · · · · · · · · · · · ·				 				
Phenol	ug/L	12	U	10	U	1.4	Ţ	10	U	
bis(2-Chloroethyl) ether	ug/L	12	U	10	U	10	ΰ	10	U	
2-Chlorophenol	ug/L	12	U	10	U	10	บ	10	U	
1,3-Dichlorobenzene	ug/L	12	U	10	U	10	υ	. 10	U	
1,4-Dichlorobenzene	ug/L	12	บ	10	U	10	บ	10	ប	
1,2-Dichlorobenzene	ug/L	12	U	10	U	10	U	10	U	
2-Methylphenol	ug/L	12	U	10	ប	10	บ	10	U	
2,2'-Oxybis(1-Chloropropane)	ug/L	12	U	10	U	10	υ	10	U	
4-Methylphenol	ug/L	12	U	10	ប	10	U	10	U	
N-Nitrosodi-n-propylamine	ug/L	12	U	10	U	10	υ	10	U	
Hexachloroethane	ug/L	12	U	10	U	10	U	. 10	U	
Nitrobenzene	ug/L	12	U	10	U	10	U	10	U	
Isophorone	ug/L	12	U	10	U	10	U	10	υ	
2-Nitrophenol	ug/L	12	U	10	U	10	U	10	U	
2,4-Dimethylphenol	ug/L	12	U	10	U	10	· U	10	U	
bis(2-Chloroethoxy)methane	ug/L	12	υ	10	U	10	U	10	U	
2,4-Dichlorophenol	ug/L	12	บ	10	บ	10	U	10	U	
1,2,4-Trichlorobenzene	ug/L	12	U	10	U	10	U	10	U	
Naphthalene	ug/L	12	บ	10	U	10	U	10	υ	
4-Chloroaniline	ug/L	12	U	10	U	10	U	10	U	
Hexachlorobutadiene	ug/L	12	U	10	U	10	ប	10	U	
4-Chloro-3-methylphenol	ug/L	12	υ	10	U	10	U	10	U	
2-Methylnaphthalene	ug/L	12	U	10	U	10	U	10	U	
Hexachlorocyclopentadiene	ug/L	60	Ü	50	U	50	U	50	U	
2,4,6-Trichlorophenol	ug/L	12	U	10	U	10	U	10	U	
2,4,5-Trichlorophenol	ug/L	12	U	10	U	10	U	10	U	
2-Chloronaphthalene	ug/L	12	U	10	U	10	U	10	U	
2-Nitroaniline	ug/L	60	U	50	U	50	U	50	U	
Dimethyl phthalate	ug/L	12	U	10	U	10	บ	10	U	
Acenaphthylene	ug/L	12	บ	10	U	10	U	10	U	
2,6-Dinitrotoluene	ug/L	12	U	10	U	10	U	10	U	
3-Nitroaniline	ug/L	60	U	50	U	50	U	50	U	
Acenaphthene	ug/L	12	U	10	υ	10	υ	10	υ	
2,4-Dinitrophenol	ug/L	60	U	50	U	50	U	50	U	
4-Nitrophenol	ug/L	60	U	50	Ū	50	U	50	U	
Dibenzofuran	ug/L	12	Ū	10	Ü	10	U	10	U	
2,4-Dinitrotoluene	ug/L	12	U	10	Ü	10	Ū	10	U	

Target Compound List Set. Aatile Organic Compounds Aqueous Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		CL:WS-ER	101*	GL-WS-ER-	·102°	GL WS-ER	103°	GL-WS-ER	104*	
DEPTH:		N/A		N/A		N/A		N/A		
DATE COLLECTED:	1	4/9/96)	4/10/9	6	4/11/9	5	4/11/96		
MOISTURE CONTENT: MATRIX:		N/A		N/A		N/A		N/A		
		WATE	₹	WATER	R	WATER	t I	WATER		
ANALYTE	UNITS									
Diethyl phthalate	ug/L	12	U	10	U	10	υ	10	U	
4-Chlorophenyl phenyl ether	ug/L	12	U	10	U	10	U	10	U	
Fluorene	ug/l.	12	U	10	U	10	U	10	U	
4-Nitroaniline	ug/L	60	U	50	บ	50	U	50	U	
4,6-Dinitro-2-methylphenol	ug/L	60	U	50	U	50	u	50	U	
N-Nitrosodiphenylamine	ug/l.	12	U	10	U	10	U	10	U	
4-Bromophenyl phenyl ether	ug/L	12	U	10	U	10	U	10	U	
l fexachlorobenzene	ug/L	12	U	10	U	10	U	10	U	
l'entachlorophenoi	ug/t.	60	U	50	U	50	U	50	u	
Phenanthrene	ug/L	12	U	10	U	10	U	10	U	
Anthracene	ug/L	12	υ	10	U	10	U	10	U	
Carbazole	ug/L	12	υ	10	U	10	U	10	U	
Di n-butyl phthalate	ug/l.	12	υ	10	U	10	U	10	U	
Fluoranthene	ug/L	12	U	10	U	10	บ	10	U	
l'yrene	ug/L	12	U	10	U	10	U	10	U	
Butyl benzyl phthalate	ug/L	12	U	10	U	10	U	10	U	
1,3' Dichlorobenzidine	ug/L	60	U	50	U	50	U	50	U	
Benzo(a)anthracene	ug/L	12	U	10	U	10	U	10	U	
Chrysene	ug/L	12	U	10	U	10	U	10	U	
bis(2 Ethylhexyl) phthalate	ug/L	12	U	3.3	J	10	U	10	U	
Di-n-octyl phthalate	ug/L	12	U	, 10	U	10	U	10	U	
Benzo(b)fluoranthene	ug/L	12	U	10	U	10	U	10	U	
Benzo(k)fluoranthene	ug/L	12	IJ	10	U	10	U	10	U	
Benzo(a)pyrene	ug/L	12	U	10	U	10	U	10	U	
Indeno(1,2,3-cd)pyrene	ug/L	12	บ	10	U	10	U	10	U	
Dibenz(a,h)anthracene	ug/L	12	U	10	U	10	υ	10	U	
Benzo(ghi)perylene	ug/L	12	U ·	10	U	10	U	10	U	

- J This result should be considered a quantitative estimate.
- B. This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration.
- U This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.
- UJ This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate.
- N/A Not applicable.
- - This sample is an Equipment Rinsate Blank.

Approved for Quality

Assurance Release by:

Rev. 0

4/12/86

Farget Compound List Compounds Soil Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-SS-SN	1-1-4	GL-SS-SM	I-1- 4	GL-SS-SM	i-1-4	GL-SS-SM	-1-4	GL-SS-SM	-5-6	GL-SS-SM	1-5-6
DEPTH:		5'-7'		15'-1 <i>7</i> '	•	17'-19'		21'-23	21'-23'			11'-13'	•
DATE COLLECTED:		4/12/9	96	4/12/9	6	4/12/9	4/12/%		4/12/96		4/12/96		96
MOISTURE CONTENT:		34.8		20.2		15.0		21.6		18.3		17.5	
MATRIX:		SOLII)	SOLID		SOLID		SOLIE)	SOLIE)	SOLIE)
ANALYTE	UNITS												
alpha-BHC	ug/kg	25	UJ	420	U	20	บ	11	U	410	U	20	U
beta-BHC	ug/kg	25	UJ	420	ប	20	υ	11	U	410	U	20	υ
delta-BHC	ug/kg	25	UJ	420	U	20	U	11	U	410	U	20	U
gamma-BHC (Lindane)	ug/kg	25	UJ	420	U	20	U	11	U	410	U	20	U
Heptachlor	ug/kg	25	UJ	420	Ü	20	U	11	U	410	U	20	U
Aldrin	ug/kg	25	UJ	420	U	20	U	11	U	410	U	20	U
Heptachlor epoxide	ug/kg	25	UJ	420	U	20	U	11	U	410	U	20	ប
Endosulfan I	ug/kg	25	UJ	420	U	20	U	11	U	410	U	20	U
Dieldrin	ug/kg	51	UJ	830	U	. 39	U	21	U	820	U	40	U
4,4'-DDE	ug/kg	51	UJ	830	U	39	U	21	U	820	บ	40	U
Endrin	ug/kg	51	UJ	830	U	3 9	U	21	ប	820	บ	40	U
Endosulfan II	ug/kg	51	UJ	830	U	39	U	21	U	820	U	40	U
4,4'-DDD	ug/kg	51	UJ	830	U	39	U	21	U	820	U	40	U
Endosulfan sulfate	ug/kg	51	UJ	830	U	39	U	21	U	820	U	40	U
4,4'-DDT	ug/kg	51	UJ	830	υ	39	บ	21	บ	820	U	40	บ
Methoxychlor	ug/kg	250	IJ	4200	U	200	υ	110	U	4100	U	200	U
Endrin ketone	ug/kg	51	ប្យ	830	U	39	U	21	U	820	U	40	U
Endrin aldehyde	ug/kg	51	UJ	830	U	39	U	21	υ	820	U	40	U
alpha-Chlordane	ug/kg	25	Uj	420	U	20	U	11	υ	410	U	20	υ
gamma-Chlordane	ug/kg	25	UJ	420	U	20	U	11	U	410	U	20	U
Toxaphene	ug/kg	1300	U)	21000	υ	980	U	530	U	20000	U	1000	U
Aroclor 1016	ug/kg	250	UJ	4200	U	200	U	110	U	4100	U	200	บ
Aroclor 1221	ug/kg	250	υj	4200	U	200	ับ	110	U	4100	U	200	U
Aroclor 1232	ug/kg	250	UJ	4200	U	200	U	110	U	4100	U	200	υ
Aroclor 1242	ug/kg	250	υj	4200	U	200	U	110	U	4100	U	200	U
Aroclor 1248	ug/kg	250	UJ	4200	U	200	U	110	U	4100	U	200	υ
Aroclor 1254	ug/kg	360	J	8300	U	390	U	210	U	8200	U	400	U
Arocior 1260	ug/kg	510	UJ	8300	Ü	390	U	210	U	8200	U	400	υ
		1		1		1		1		ł		l	

J - This result should be considered a quantitative estimate.

Approved for Quality
Assurance Release by:
Rev. 6
Date 6/(2/9)

File Pest/Sol/Combine

B - This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration.

U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

UJ - This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate.

Target Compound List Acide/PCB Compounds Soil Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-SS-SM	-5-6	GL-SS-SM	1-5:6	GL-SS-SM	1-7-8	GL-SS-SM	1-7-8	GL/SS/SM	1-7-8
DEPTH:]	15'-17'		201-22	20'-22'		3'-5'			15'-1 <i>7</i>	
DATE COLLECTED: MOISTURE CONTENT: MATRIX:		4/12/9	4/12/96		6	4/12/9	6	4/12/9	16	4/12/9	M
		19.9 SOLID		19.6	19.6			160		20 8	
				SOLID		SOLID		SOLID		SOLIL)
ANALYTE	UNITS	_								I	
alpha-BHC	ug/kg	21	υ	10	υ	410	U	400	U	21	U
beta-BHC	ug/kg	21	U	10	υ	410	U	400	U	21	U
delia BHC	ug/kg	21	U	10	υ	410	U	400	U	21	U
gamma BHC (Lindane)	ug/kg	21	U	10	u	410	U	400	U	21	U
Heptachlor	ug/kg	21	U	10	υ	410	U	400	U	21	U
Aldrin	ug/kg	21	U	10	υ	410	U	400	U	21	U
Heptachlor epoxide	ug/kg	21	U	10	U	410	U	400	U	21	υ
Endonulfan I	ug/kg	21	U	10	U	410	υ	400	U	21	U
Dieldrin	ug/kg	42	U	21	U	820	U	790	U	42	U
4,4" DDE	ug/kg	42	U	21	U	820	U	790	υ	42	U
Endrin	ug/kg	42	U	21	U	820	U	790	υ	42	U
Endosultan II	ug/kg	42	U	21	U	820	U	790	U	42	U
4,4°-DDD	ug/kg	42	U	21	υ	820	υ	740	U	42	ţ)
Endosulfan sulfate	ug/kg	42	U	21	U	820	U	790	U	42	U
4,4" DDT	ug/kg	42	U	21	U	820	υ	790	υ	42	U
Methoxychlor	ug/kg	210	U	100	U	4100	U	4000	υ	210	υ
Endrin ketone	ug/kg	42	U	21	υ	820	U	630	J	42	U
Endrin aldehyde	ug/kg	42	U	21	υ	820	U	790	U	42	υ
alpha-Chlordane	ug/kg	21	U	10	บ	410	U	400	υ	21	υ
gamma-Chlordane	ug/kg	21	U	10	U	410	υ	400	U	21	U
Toxaphene	ug/kg	1000	U	520	υ	20000	U	20000	U	1000	U
Aroclor 1016	ug/kg	210	U	100	υ	4100	U	4000	U	210	U
Aroclor 1221	ug/kg	210	U	100	υ	4100	U	4000	U	210	U
Aroclor 1232	ug/kg	210	υ	100	U	4100	U	4000	U	210	υ
Aroclor 1242	ug/kg	210	U	100	U	4100	U	4000	U	210	U
Aroclor 1248	ug/kg	210	U	100	U	4100	U	4000	U	210	U
Aroclor 1254	ug/kg	420	U	210	U	8200	U	5800	J	420	U
Aroclor 1260	ug/kg	420	U	210	U	8200	U	7900	U	420	U

J - This result should be considered a quantitative estimate.

Approved for Quality
Assurance Release by:

Rev. O

Date 6/12/

B - This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration.

U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

UJ - This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate.

Farget Compound List cide/PCB Compounds Soil Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-SS-SN	<i>I</i> -8	GL-SS-SM	-9 -10	GL-SS-SM	1-9-10	GL-SS-SM	-9-10	GL-SS-SS	
DEPTH:		0'-1'	0'-1'		4'-6'		6'-8'			0'-1'	
DATE COLLECTED:	DATE COLLECTED:		4/11/96		4/12/96		4/12/96		4/12/96		6
MOISTURE CONTENT:		17.6		16.6		19.1		33.7		20.3	
MATRIX:		SOLID)	SOLID		SOLID		SOLID		SOLID	
ANALYTE	UNITS										
alpha-BHC	ug/kg	2000	υ	2.0	U	21	U	13	U	2100	υ
beta-BHC	ug/kg	2000	U	2.0	U	21	U	13	υ	2100	U
delta-BHC	ug/kg	2000	บ	2.0	บ	21	U	13	U	2100	U
gamma-BHC (Lindane)	ug/kg	2000	U	2.0	U	21	U	13	U	2100	U
Heptachlor	ug/kg	2000	U	2.0	U	21	U	13	บ	2100	U
Aldrin	ug/kg	2000	U	2.0	U	21	U	13	U	2100	U
Heptachlor epoxide	ug/kg	2000	U	2.0	U	21	U	13	U	2100	U
Endosulfan I	ug/kg	2000	U	2.0	U	21	U	13	U	2100	U
Dieldrin	ug/kg	4000	U	4.0	U	41	U	25	U	4200	U
4,4'-DDE	ug/kg	4000	U	4.0	U	41	U	25	U	4200	U
Endrin	ug/kg	4000	υ	4.0	บ	41	U	25	U	4200	U
Endosulfan II	ug/kg	4000	U	4.0	บ	41	U	25	U	4200	U
4,4'-DDD	ug/kg	4000	U	4.0	U	41	U	25	U	4200	U
Endosulfan sulfate	ug/kg	4000	U	4.0	U	41	U	25	U	4200	U
4,4'-DDT	ug/kg	4000	U	4.0	U	41	U	25	U	4200	U
Methoxychlor	ug/kg	20000	U	20	U	210	U	130	U ·	21000	U
Endrin ketone	ug/kg	4000	υ	4.0	U	41	Ū	25	U	4200	U
Endrin aldehyde	ug/kg	4000	U	4.0	U	41	U	25	บ	4200	U
alpha-Chlordane	ug/kg	2000	U	2.0	บ	21	U	13	บ	2100	U
gamma-Chlordane	ug/kg	2000	U	2.0	U	21	U	13	บ	2100	U
Toxaphene	ug/kg	100000	U	100	U	1000	U	630	U	100000	U
Aroclor 1016	ug/kg	20000	U	40	U	210	U	130	U	21000	U
Aroclor 1221	ug/kg	20000	U	40	U	210	U	130	U	21000	U
Aroclor 1232	ug/kg	20000	U	40	U	210	U	130	U	21000	U
Aroclor 1242	ug/kg	20000	U	40	U	210	υ	130	U	21000	U
Aroclor 1248	ug/kg	20000	U	40	U	210	ប	130	U	21000	U
Aroclor 1254	ug/kg	40000	U	40	U	410	U	250	U	38000	J
Aroclor 1260	ug/kg	40000	U	40	U	410	U	250	U	42000	U
		1		1_				<u> </u>		<u> </u>	

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Assurance Release by:

Rev. 0

Date 6/1486

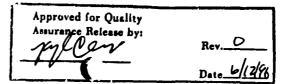
File Pest/Soil/Combine

SAMPLE LOCATION:		GL-W5-SI	M-1	CL-WS-SM-	1 DUP	GL-WS-SI	M-4	GL-WS-S	M-8	GL-WS-9	M-9
DEPTIL	1	N/A		N/A		N/A		N/A	i	N/A	i
DATE COLLECTED:	Į.	4/9/96	5	4/9/9	5	4/11/9	6	4/11/	96	4/12/	96
MOISTURE CONTENT:	İ	N/A		N/A		N/A		N/A	ı	N/A	ı
MATRIX:	1	WATE	R	WATE	R	WATE	R	WATE		WATE	ĸ
ANALYTE	UNITS		**							<u> </u>	
alpha-BHC	ug/L	3 0	υ	30	U	13	U	140	U	3 2	U
beta-BHC	ug/L	30	υ	30	U	13	U	140	U	3 2	υ
delta-BHC	ug/L	30	U	30	U	13	U	140	U	3 2	U
gamma-BHC (Lindane)	ug/t.	30	U	30	υ	13	U	140	U	3 2	U
Heptachlor	ug/L	30	U	30	υ	13	υ	140	U	3.2	U
Aldrin	ug/L	30	U	30	υ	13	U	140	บ	3.2	U
Heptachlor epoxide	ug/L	30	U	30	U	13	U	140	U	3 2	U
Endosulfan I	ug/L	30	υ	30	U	13	U	140	U	3 2	U
Dieldrin	ug/L	60	U	60	U	26	บ	280	U	64	U
4,4° DDE	ug/L	60	U	60	U	26	U	280	U	64	U
Endrin	ug/L	60	U	60	U	26	U	280	U	6.4	υ
Endosulfan II	ug/L	60	U	60	U	26	U	280	U	64	U
4,4'-DDD	ug/L	60	U	60	U	26	U	280	U	6.4	U
Endosulfan sulfate	ug/L	60	U	60	U	26	U	280	U	6.4	U
4,4° DDT	ug/L	60	U	60	U	26	υ	280	U	6.4	U
Methoxychlor	ug/L	300	U	300	U	130	U	1400	U	32	υ
Endrin ketone	ug/L	60	υ	60	U	26	U	280	υ	6.4	U
Endrin aldehyde	ug/L	60	U	60	U	26	U	280	U	6.4	U
alpha-Chlordane	ug/L	30	U	30	U	13	U	140	U	3 2	U
gamma-Chlordane	ug/L	30	Ų	30	U	13	U	140	U	32	U
Toxaphene	ug/L	1500	υ	1500	U	660	U	7000	U	160	U
Aroclor 1016	ug/L	300	U	300	U	260	U	2800	U	64	U
Aroclor 1221	ug/L	300	υ	300	U	260	υ	2800	υ	64	U
Aroclor 1232	ug/L	300	υ	300	υ	260	U	2800	U	64	U
Aroclor 1242	ug/L	300	U	300	U	260	U	2800	U	64	U
Aroclor 1248	ug/L	300	U	300	U	260	U	2800	U	64	υ
Arocior 1254	ug/L	600	U	600	U	260	υ	2800	U	64	υ
Aroclor 1260	ug/L	600	U	600	U	260	υ	2800	U	64	U

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N/A · Not applicable.

* - This sample is an Equipment Rinsate Blank.



Arget Compound List Acide/PCB Compound Aqueous Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-WS-ER-	101*	GL-WS-ER	-102*	GL-WS-ER	-103*	GL-WS-ER-	104*
DEPTH:		N/A		N/A		N/A		N/A	
DATE COLLECTED:		4/9/96	,	4/10/9	6	4/11/9	6	4/11/96	5
MOISTURE CONTENT:		N/A		N/A		N/A		N/A	
MATRIX:		WATER	₹ .	WATE	R	WATE	₹ .	WATER	t
ANALYTE	UNITS								
alpha-BHC	ug/L	0.050	U	0.050	Ü	0.050	บ	0.050	U
beta-BHC	ug/L	0.050	U	0.050	U	0.050	U	0.050	U
delta-BHC	ug/L	0.050	υ	0.050	U	0.050	U	0.050	υ
gamma-BHC (Lindane)	ug/L	0.050	U	0.050	U	0.050	υ	0.050	U
Heptachlor	ug/L	0.050	Ü	0.050	U	0.050	U	0.050	U
Aldrin	ug/L	0.050	U	0.050	U	0.050	U	0.050	υ
Heptachlor epoxide	ug/L	0.050	υ	0.050	U	0.050	υ	0.050	บ
Endosulfan 1	ug/L	0.050	U	0.050	U	0.050	U	0.050	U
Dieldrin	ug/L	0.062	U	0.050	υ	0.053	U	0.062	U
4,4'-DDE	ug/L	0.062	U	0.050	Ú	0.053	U	0.062	U
Endrin	ug/L	0.062	U	0.050	U	0.053	U	0.062	υ
Endosulfan II	ug/L	0.062	U	0.050	U	0.053	U	0.062	U
4,4'-DDD	ug/L	0.062	U	0.050	บ	0.053	U	0.062	U
Endosulfan sulfate	ug/L	0.062	ប	0.050	U	0.053	U	0.062	U
4,4'-DDT	ug/L	0.062	ប	0.050	U	0.053	U	0.062	U
Methoxychlor	ug/L	0.31	U	0.10	U	0.26	U	0.31	U
Endrin ketone	ug/L	0.062	U	0.050	ប	0.053	U	0.062	U
Endrin aldehyde	ug/L	0.062	U	0.050	U	0.053	U	0.062	U
alpha-Chlordane	ug/L	0.050	U	0.050	U	0.050	ប	0.050	U
gamma-Chlordane	ug/L	0.050	U	0.050	U	0.050	U	0.050	บ
Toxaphene	ug/L	2.0	U	2.0	U	2.0	U	2.0	U
Aroclor 1016	ug/L	1.0	U	1.0	U	1.0	U	1.0	U
Aroclor 1221	ug/L	1.0	U	1.0	U	1.0	U	1.0	U
Aroclor 1232	ug/L	1.0	U	1.0	U	1.0	U	1.0	U
Aroclor 1242	ug/L	1.0	U	1.0	U	1.0	U	1.0	U
Aroclor 1248	ug/L	1.0	U	1.0	U	1.0	U	1.0	ប
Aroclor 1254	ug/L	1.0	Ŭ	1.0	U	1.0	U	1.0	U -
Aroclor 1260	ug/L	1.0	U	1.0	U	1.0	U	1.0	U

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N/A - Not applicable.

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Assurance Release by:

Rev. 6

Date 6(1/96

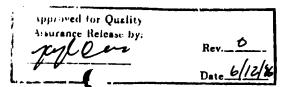
File, Pest/Aqu./Combined 6/11/96

Priority Pollulant List To Metals/TCLP List Metals Soil/Leachate Analytical Results The Lubrizol Corporation Greiner's Laguon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-SS-SI	4-1-4	GL-SS-SM	1-1-4	GL-SS-SM	1-1-4	GL-SS-SN	1-1-4	GL-SS-SM	-5-6	GL-SS-SA	4-5-6
DEPTH:		5.7		15'-17		17:-19		211-23	•	51.7		117-13	3.
DATE COLLECTED:		4/12/	96	4/12/9	6	4/12/9	76	4/12/9	X 6	4/12/9	6	4/12/	96
MOISTURE CONTENT:		34 8		20.2		15.0		21.6		18 3		17.5	i
MATRIX:		SOLI	D	SOLIL)	SOLIL)	SOLII	נ	SOLID)	SOLI	D
ANALYTE	UNITS			1		<u> </u>							
Antimony	mg/kg	15	UJ	1.3	UJ	1.2	UJ	1.3	บเ	12	UJ	12	UJ
Amenic	mg/kg	58		4 2		8.1		100		117		64	
Beryllium	mg/kg	0 <i>7</i> 7	U)	0 63	UJ	0 59	UJ	0.64	UJ	0.61	UJ	0.61	UJ
Cadmium	mg/kg	19		0.64		1.0		0.48		1.3		U 2H	
Chromium	mg/kg	12.3		47		84		121		40		69	
Copper	mg/kg	48.1	j	110	1	15.3)	217	J	12 1	J	14.6	J
Lead	mg/kg	58 0	J	80	J	10.4	J	10 6	J	45.7	1	74	J
Mercury	mg/kg	0.15	U	0.61		0.12	U	0.13	U	0 12	U	0.12	U
Nickel	mg/kg	11.7	J	10.7	J	15.6	1	24.8	,	116	J	15.4	1
Selenium	mg/kg	0.77	UJ	0.63	UJ	0.59	UJ	0.64	UJ	0.61	UJ	0.61	UJ
Silver	mg/kg	0.77	U	0.63	U	0.59	U	0.64	U	0.61	U	0.61	U
Thallium	mg/kg	15	UJ	1.3	UJ	12	υJ	1.3	UJ	12	UJ	1 2	UJ
Zinc	mg/kg	155	J	31.9	J	40.7	J	54.5	J	72 6	1	40.3	J
Arsenic -TCLP	mg/L	0.50	U	0.50	υ	0.50	υ	0.50	U	0.50	U	0.50	U
Barium TCLP	mg/L	10.0	U	10.0	U	10.0	U	10.0	U	100	U	10 0	U
Cadmium -TCLP	mg/L	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0 10	U
Chromium -TCLP	mg/L	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Lead -TCLP	mg/L	0.50	U	0.50	U	0.50	U	0.50	υ	0.50	υ	0.50	υ
Mercury -TCLP	mg/L	0.0020	U	0.0020	U	0.0020	U	0.0020	U	0.0020	U	0 0020	U
Selenium -TCLP	mg/L	0.25	บ	0.25	U	0.25	υ	0.25	U	0.25	U	0.25	U
Silver -TCLP	mg/L	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U

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Soil/Leachate Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-SS-SM	1-5-6	GL-SS-SM	1-5-6	GL-SS-SM	i-7-8	GL-SS-SM	1-7-8	GL-SS-SM	1-7-8
DEPTH:	ĺ	15'-17	,	20'-22	•	3'-5'		7'-9'	1	15'-17	
DATE COLLECTED:		4/12/9	6	4/12/9	96	4/12/9	6	4/12/9	6	4/12/9	96
MOISTURE CONTENT:		19.9		19.6		18.5		16.0		20.8	
MATRIX:		SOLII)	SOLI)	SOLIE)	SOLI)	SOLI)
ANALYTE	UNITS					1					
Antimony	mg/kg	1.2	UJ	1.2	υj	1.2	UJ	1.2	UJ	1.3	UJ
Arsenic	mg/kg	7.2		6.5		5.8		9.5		11.9	
Beryllium	mg/kg	0.62	UJ	0.62	υj	0.61	UJ	0.59	UJ	0.63	UJ
Cadmium	mg/kg	0.25	U	0.25	บ	8.5		0.75		0.27	
Chromium	mg/kg	11.0		11.8		21.9		6.8		13.6	
Copper	mg/kg	16.5	J	15.4	J	30.5	J	11.4	J	17.6	J
Lead	mg/kg	8.7	j	7.2	J	228	J	20.0	J	8.6	J
Mercury	mg/kg	0.12	U	0.12	U	0.33		0.12	U	0.13	U
Nickel	mg/kg	19.2	Ţ	17.9	J	13.8	J	10.4	J	21.0	J
Selenium	mg/kg	0.62	UJ	0.62	UJ	0.61	UJ	0.59	UJ	0.63	UJ
Silver	mg/kg	0.62	U	0.62	U	0.61	U	0.59	U	0.63	U
Thallium	mg/kg	1.2	UJ	1.2	UJ	1.2	UJ	1.2	υj	1.3	UJ
Zinc	mg/kg	41.5	J	37.9	J	407		51.6	J	43.8	J
Arsenic -TCLP	mg/L	0.50	U	0.50	Ū	0.50	U	0.50	Ü	0.50	U
Barium -TCLP	mg/L	10.0	U	10.0	U	10.0	U	10.0	υ	10.0	U
Cadmium -TCLP	mg/L	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
Chromium -TCLP	mg/L	0.50	U	0.50	U	0.50	บ	0.50	U	0.50	U
Lead -TCLP	mg/L	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Mercury -TCLP	mg/L	0.0020	ប	0.0020	U	0.0020	U	0.0020	· U	0.0020	U
Selenium -TCLP	mg/L	0.25	U	0.25	U	0.25	U	0.25	U	0.25	υ
Silver -TCLP	mg/L	0.50	U	0.50	บ	0.50	U	0.50	U	0.50	U

^{] -} This result should be considered a quantitative estimate.

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File PPL/TCLP/Metals/Soil/Combined 6/11/96

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Priority Pollulant List To Metals/TCLP List Metals Soll/Leachate Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

L	GL-SS-SI	M-8	GL:SS-SM	-9-10	GL-SS-SM	-9-10	GL-SS-SM	-9-10	GL-SS	SS
1	0.1,		4'-6'		6'-8'		12'-14		0.1	•
	4/12/9	16	4/12/9	36	4/12/9	76	4/12/9	16	4/10/	96
	17.6		16.6		19.1		33.7		20 3)
	SOLIL)	SOLI)	SOLI)	SOLIE)	SOLI	Ð
UNITS									1	
mg/kg	6 2	J	12	UJ	1.2	UJ	1.5	UJ	1.3	U
mg/kg	71		4.5		60		12.7		нн	
mg/kg	061	UJ	0.60	υj	0.62	UJ	0.75	UJ	063	U
mg/kg	43.7		0 24	U	0.25	U	0.34		7.5	
mg/kg	94 6		6.2		6.0		16.8		22 7	
mg/kg	102	J	80	J	13.3	J	26.6	J	29.3	
mg/kg	811	1	4.8	J	66	J	126	J	98.0	
mg/kg	1.3		0.12	U	0.12	U	0 15	U	0.33	
mg/kg	31.3	J	Ψ.8	J	139	j	31.4	j	18.6	
mg/kg	34	J	0.60	UJ	0.62	UJ	0.75	UJ	0.63	UJ
mg/kg	0.61	U	0.60	U	0.62	U	0.75	U	0.63	U
mg/kg	1 2	UJ	12	UJ	1.2	UJ	1.5	UJ	1.3	υ
mg/kg	2470	J	30 3	J	33 2	1	67.5	J	175	
mg/L	0.50	υ	0.50	U	0.50	U .	0.50	Ū	0.50	Ü
mg/L	10.0	υ	10.0	U	10.0	U	10.0	U	100	U
	0.10	U	0.10	U	0.10	U	0.10	U	0 10	U
	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
	0.50	U	0.50	U	0.50	υ	0.50	U	0.50	U
mg/L	0.0020	U	0.0020	U	0.0020	U	0.0020	U	0 0020	U
mg/L	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
mg/L	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
	mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/l mg/L mg/L mg/L mg/L	0'-1' 4/12/5 17.6 SOLIL UNITS mg/kg 1.3 mg/kg 3.4 mg/kg 0.61 mg/kg 1.2 mg/kg 1.2 mg/kg 1.0.50 mg/L mg/L mg/L 0.50 mg/L 0.50 mg/L 0.50 mg/L 0.50 mg/L 0.50 mg/L 0.50 mg/L 0.50	### ##################################	0'-1' 4'-6' 4/12/96 4/12/96 17.6 16.6 SOLID SOLID	0'-1' 4'-6' 4/12/96 4/12/96 17.6 16.6 SOLID SOLID UNITS mg/kg 62 J 12 UJ mg/kg 71 4.5	0'-1' 4'-6' 6'-8' 4/12/96 4/12/96 4/12/96 17.6 16.6 19.1	0'-1' 4'-6' 6'-8' 4/12/96 17.6 16.6 19.1 SOLID	0°-1° 4'-6° 6'-8° 12'-14 4/12/96 4/12/96 4/12/96 4/12/96 4/12/96 17.6 16.6 19.1 33.7 SOLID SOLID SOLID SOLID		0°-1′ 4'-6′ 6'-8′ 12'-14′ 0'-1′ 4'/12/96 4//12/96

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Priority Pollulan. Ist Total Metals Aqueous Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATI	ON:	GL-WS-S	M-4	GL-WS-9	5M-8	GL-WS-S	M-9	GL-WS-EI	₹-102*	GL-WS-ER	-103°	GL-WS-EF	R-104*
DEPTH:		N/A		N/A	\	N/A		N/A		N/A		N/A	
DATE COLLECTE	iD:	4/11/9)6	4/11/	96	4/12/9	6	4/10/	96	4/11/9	6	4/11/9	96
MOISTURE CONT	TENT:	N/A		N/A		N/A		N/A		N/A		N/A	
MATRIX:		WATE	R	WATI	ER	WATE	R	WATE	R	WATE	R	WATE	R
ANALYTE	UNITS												
Antimony	mg/L	0.010	U	0.010	U	0.020	U	0.010	U	0.010	U	0.010	U
Arsenic	mg/L	0.095		0.35		0.11		0.010	U	0.010	U	0.010	U
Beryllium	mg/L	0.0050	U	0.0050	U	0.010	U	0.0050	บ	0.0050	U	0.0050	U
Cadmium	mg/L	0.011		0.0085		0.013		0.0020	U	0.0020	U	0.0020	U
Chromium	mg/L	0.070		0.10		0.20		0.0050	υ	0.0050	U	0.0050	U
Copper	mg/L	0.18		0.18		0.63		0.025	ប	0.025	U	0.025	U
Lead	mg/L	0.19		0.21		0.33		0.0030	U	0.0040		0.0030	U
Mercury	mg/L	0.0010	U	0.00020	U	0.00052		0.00020	U .	0.00020	U	0.00020	U
Nickel	mg/L	0.17		0.84		0.42		0.040	υ	0.040	U	0.040	U
Selenium	mg/L	0.020	UJ	0.040	UJ	0.010	UJ	0.0050	U	0.0050	U	0.0050	U
Silver	mg/L	0.010	Ú	0.0050	U	0.010	Ű	0.0050	υ	0.0050	U	0.0050	U
Thallium	mg/L	0.020	U	0.010	υ	0.020	U	0.010	บ	0.010	U	0.010	บ
Zinc	mg/L	1.1		0.68		1.6		0.050	U	0.050	U	0.050	U

- J This result should be considered a quantitative estimate.
- B This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration.
- U This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.
- UJ This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate.

N/A - Not applicable.

* - This sample is an Equipment Rinsate Blank.

Approved for Quality
Assurance Release by:

Rev. O

Date 5/12/96

File: PPL/Metals/Aqu/Combined 6/11/96

Target Analytic. at Total Metals Aqueous Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCA	ATION:	GL-WS-SN	4-1	GL-WS-SM-1	1 DUP	GL-WS-ER-	101.
DEPTH:	Ì	N/A		N/A	1	N/A	
DATE COLLEC	TED:	4/9/96		4/9/96	,	4/9/96	
MOISTURE CO	ONTENT:	N/A	1	N/A		N/A	
MATRIX:	l	WATER	t l	WATE	₹	WATER	ł .
ANALYTE	UNITS						
Silver	mg/L	0 0050	υ	0 0050	υİ	0 0050	U
Cadmium	mg/L	0 022	J	0 024	J	0.0020	U
Chromium	mg/l.	0 26		U 27	Į.	0 0050	U
Lead	mg/L	3.5		3.2	j	0.0030	U
Antimony	mg/L	0 020	j	0 017)	0 010	U
Thallium	mg/L	0 010	UJ	0 010	UJ	0 010	U
Aluminum	mg/L	52 6		62 4		1 2	
Barium	mg/L	93		8.8	ł	0.20	U
Beryllium	mg/L	0.0050	UJ	0.0050	Ľ)	0 0050	υ
Calcium	mg/L	2840		3140		5.0	υ
Cobalt	mg/L	0.050	UJ	0.050)	0.050	U
Copper	mg/L	0.54	J	0 60	, ,	0.025	U
Iron	mg/t.	102		110		3 1	
Potassium	mg/t.	164		164	ŀ	5.0	υ
Magnesium	mg/L	500		498	ł	5.0	U
Manganese	mg/L	2.2		2.3	l	0.047	
Sodium	mg/L	878		899		5.0	U
Nickel	mg/L	0.30	J	0.30		0.040	υ
Vanadium	mg/L	0.19	J	0.22	J]	0.050	U
Zinc	mg/L	34		3.6	Ī	0.050	U
Arsenic	mg/L	0.081	J	0.025	J	0.010	U
Mercury	mg/L	0.0022	j	0.0064	J	0.00020	υ
Selenium	mg/L	0.040	UJ	0.020	UJ	0.0050	U

J - This result should be considered a quantitative estimate.

N/A - Not applicable.

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Assurance Release by:	Rev. 6
77	Date 6/12/86

B - This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration.

U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

UJ - This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate.

^{* -} This sample is an Equipment Rinsate Blank.

Soil Borings/Monitoring Wells

ANALYTICAL QUALITY ASSURANCE REPORT

Lubrizol Corporation
Greiner's Lagoon Site
Sandusky County, Ohio
Ground Water and Soil Samples
Collected 24 June
Through 24 July 1996
In Association with the
Engineering Evaluation/Cost Analysis
(EE/CA) Site Investigation

17 September 1996

Environmental Resources Management, Inc.

855 Springdale Drive Exton, Pennsylvania 19341

File No.: 09928.00.01

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Scott J. Brecker
Quality Assurance Chemist

Technical Reviewer

Environmental Resources Management, Inc.

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TABLE OF CONTENTS

1.0	INT	RODUCI	TON	1
2.0	ORG	GANIC D	ATA	2
	2.1	ORGA	NIC DATA QUALIFIERS	2
		2.1.1	General Organic Data Qualifiers	2
		2.1.2	Soil Organic Data Qualifiers	3
		2.1.3	Ground Water Organic Data Qualifiers	7
3.0	INO	RGANIC	DATA	11
	3.1	INOR	GANIC DATA QUALIFIERS	11
		3.1.1	Soil Organic Data Qualifiers	11
		3.1.2	Ground Water Organic Data Qualifiers	14
4.0	SUN	(MARY		15

ATTACHMENTS

- 1 METHODOLOGY SUMMARY/METHOD REFERENCES
- 2 DATA SUMMARY TABLES

LIST OF TABLES

1-1 Summary of Data Reviewed

following page 1

This analytical quality assurance report is based upon a review of analytical data generated for ground water and soil samples and associated quality control samples collected 24 June 1996 through 24 July 1996 at the Lubrizol Corporation, Greiner's Lagoon Site located in Sandusky County, Ohio as part of the Engineering Evaluation/Cost Analysis (EE/CA) Site Investigation. The analytical methods which were used in these analyses are summarized and referenced in Attachment 1. The sample locations, laboratory sample identification numbers, dates of collection, and analyses performed are presented on Table 1-1. Data summary tables presenting the validated and/or qualified analytical results are provided in Attachment 2.

The analytical data were reviewed for adherence to the specified analytical protocols. The reported results for organic and inorganic analyses have been validated or qualified using general guidance provided by "National Functional Guidelines for Organic (and Inorganic) Data Review", USEPA, 2/94 (and 2/94).

Table 1-1 Summary of Data Reviewed

BACKGROUND SAMPLES

Sample Location	Laboratory ID Number	Date Sampled	Analyses Performed
GL-SS-BG-1 (0.5-1)	A6G010122-007	6/26/96	[4]
GL-95-BG-1 (0.5-1) DUPE	A6G010122-020	6/26/96	[4]
GL-SS-BG-1 (1.5-2)	A6G010122-008	6/26/96	[4]
GL-SS-BG-2 (0.5-1)	A6G010122-009	6/26/%	[4]
GL-SS-BG-2 (1.5-2)	A6G010122-010	6/26/96	[4]
GL-95-BG-3 (0.5-1)	A6G010122-011	6/26/96	[4]
GL-SS-BG-3 (1.5-2)	A6G010122-012	6/26/%	[4]
GL-SS-BG-4 (0.5-1)	A6Q010122-013	6/28/%	[4]
GL-95-BG-4 (1.5-2)	A6G010122-014	6/28/%	[4]
GL-SS-BG-5 (0.5-1)	A6G010122-015	6/28/%	[4]
GL-SS-BG-5 (1.5-2)	A6G010122-016	6/28/96	[4]
GL-BG-SB-6 (0.5-1)	A6G030148-006	7/2/%	[4]
GL-BG-SB-6 (1.5-2)	A6G030148-007	7/2/96	[4]
GL-BG-SB-7 (0.5-1)	A6G030148-008	7/2/96	[4]
GL-BG-SB-7 (0.5-1) DUP.	A6C030148-009	7/2/%	[4]
GL-BG-SB-7 (1.5-2)	A6G030148-010	7/2/96	[4]
GL-BG-SB-8 (0.5-1)	A6G030148-011	7/2/%	[4]
GL-BG-58-8 (1.5-2)	A6G030148-012	7/2/%	[4]

Table 1-1 Summary of Data Reviewed

SOIL SAMPLES

Sample Location	Laboratory ID Number	Date Sampled	Analyses Performed
GL-SS-SB-1 (6-8)	A6G030148-001	7/1/96	[1], [2], [3]
GL-SS-SB-2 (30-32)	A6G130111-002	7/11/96	[1], [2], [3]
GL-SS-SB-2 (6-8)	A6G110146-001	7/9/96	[1], [2], [3]
GL-SS-SB-3 (6-8)	A6G030148-002	7/1/96	[1], [2], [3]
GL-SS-SB-4 (8-10)	A6G010122-004	6/27/96	[1], [2], [3]
GL-SS-SB-4 (8-10) DUP.	A6G010122-005	6/27/96	[1], [2], [3]
GL-SS-SB-5 (34-36)	A6G130111-001	7/10/96	[1], [2], [3]
GL-SS-SB-5 (MW-2) (6-8)	A6G010122-001	6/26/96	[1], [2], [3]
GL-SS-SB-6 (4-6)	A6G030148-003	7/1/%	[1], [2], [3]
GL-SS-SB-7 (6-8)	A6F270131-002	6/25/96	[1], [2], [3]
GL-SS-SB-7 (35-37)	A6F270131-003	6/25/96	[1], [2], [3]
GL-SS-SB-8 (4-6)	A6G010122-003	6/27/96	[1], [2], [3]
GL-SS-SB-9 (30-32)	A6G130111-004	7/11/96	[1], [2], [3]
GL-SS-SB-9 (4-6)	A6G110146-002	7/9/%	[1], [2], [3]
GL-SS-SB-10 (6-8)	A6G010122-006	6/28/96	[1], [2], [3]
GL-SS-SB-11 (0-2)	A6G010122-002	6/27/96	[1], [2], [3]
GL-SS-SB-12 (6-8)	A6F270131-001	6/24/96	[1], [2], [3]
GL-SS-SB-13 (6-8)	A6G030148-004	7/2/%	[1], [2], [3]
GL-SS-SB-13 (6-8) DUP.	A6G030148-005	7/2/%	[1], [2], [3]

Table 1-1 Summary of Data Reviewed

WATER SAMPLES

Sample Location	Laboratory ID Number	Date Sampled	Analyses Performed
GL-WS-DECON WATER	A6F270131-004	6/24/96	[4] [6] [7] [8]
GL-WS-MW-1	A6G250142 008	7/24/96	[4], [5], [6], [7], [8]
GL-WS-MW-1 DUPE	A6G250142 009	7/24/96	[4], [5], [6], [7], [8]
GL-WS-MW-2	A6G250142 006	7/23/96	[4], [5], [6], [7], [8]
GL-WS-MW-3	A6G250142 007	7/24/96	[4], [5], [6], [7], [8]
GL-WS-MW-4	A6G250142 001	7/22/96	[4], [5], [6], [7], [8]
GL-WS-MW-5	A6G250142 005	7/23/96	[4], [5], [6], [7], [8]
GL-WS-MW-6	A6G250142 004	7/23/96	[4], [5], [6], [7], [8]
GL-WS-MW-7	A6G250142 003	7/23/%	[4], [5], [6], [7], [8]
GL-WS-MW-8	A6G250142 002	7/22/%	[4], [5], [6], [7], [8]

Table 1-1 Summary of Data Reviewed

BLANKS

Sample Location	Laboratory ID Number	Date Sampled	Analyses Performed
GL-WS-ER-201	A6G010122-017	6/27/96	[4], [6], [7], [8]
GL-WS-ER-202	A6G110146-003	7/10/96	[4], [6], [7], [8]
GL-WS-TB 7-10-96	A6G110146-004	7/10/96	[6]
GL-WS-TB 7/11/96	A6G130111-003	7/11/96	[1]
GL-WS-TB 7-24-96	A6G250142 010	7/24/96	[6]
TRIP BLANK (25C)	A6G010122-018	6/27/96	[6]
TRIP BLANK (A61)	A6G010122-019	6/27/96	[6]
TRIP BLANK (O18)	A6F270131-006	6/27/96	[1]
TRIP BLANK	A6G030148-013	7/2/96	[1]
TRIP BLANK (O84)	A6F270131-007	6/27/96	[6]

ANALYSES PERFORMED CODES:

[1] - Indicator List Volatile Organic Compounds:

Vinyl Chloride, Acetone, Carbon Disulfide, 1,1-Dichloroethene, cis-1,2-Dichloroethene, trans-1,2-Dichloroethene, 2-Butanone, Trichloroethene, Benzene, 4-Methyl-2-pentanone, Toluene, Ethylbenzene, Styrene, and Xylenes.

[2] - Indicator List Semivolatile Organic Compounds:

Phenol, 2-Methylphenol, 4-Methylphenol, Isophorone, Naphthalene, 2-Methylnaphthalene, Phenanthrene, Di-n-butylphthalate, Butylbenzylphthalate, bis(2-ethylhexyl)phthalate, 1,4-Dichlorobenzene, 1,2-Dichlorobenzene, 2,4-Dimethylphenol, 1,2,4-Trichlorobenzene.

[3] - Indicator List PCB Compounds:

Aroclor-1254

- [4] Priority Pollulant List (PPL) Metals
- [5] Cobalt.
- [6] Target Compound List (TCL) volatile organic compounds.
- [7] TCL semivolatile organic compounds.
- [8] TCL pesticide/PCB compounds.

ORGANIC DATA

The organic analyses of the ground water and soil samples and their associated field quality control samples were performed by Quanterra Environmental Services of North Canton, Ohio. The samples were analyzed for volatile organic compounds, semivolatile organic compounds and/or pesticide/PCB compounds, as indicated in Table 1-1. All sample analyses were performed according to the protocols specified in "Test Methods for Evaluating Solid Waste", SW-846, Third Edition, September 1994. The methods used for these analyses are summarized and referenced in Attachment 1.

The findings offered in this report are based on a review of data generated according to a full data deliverables format for all samples. The following deliverables were evaluated for conformance with criteria: chain of custody documentation, holding times, laboratory method, equipment rinsate, and travel blank analysis results, surrogate compound recoveries, matrix spike compound recoveries and reproducibility, field duplicate analysis results, bromofluorobenzene (BFB) and decafluoro-triphenylphosphine (DFTPP) mass tuning results, initial and continuing calibration summaries, and internal standard performance summaries.

The organic analyses were performed acceptably, but require qualifying statements. It is recommended that the reported analytical results be used only with the qualifying statements provided below. Any aspects of the data which are not discussed in this report should be considered qualitatively and quantitatively valid, as reported, based on the deliverables reviewed. Data summary tables presenting the validated and qualified results are provided in Attachment 2.

2.1 ORGANIC DATA QUALIFIERS

2.1.1 General Organic Data Qualifiers

 As required by USEPA protocol, quantitative results for volatile and semivolatile organic compounds detected at levels below their respective quantitation limits have been marked with "J" qualifiers on the data summary tables to indicate that they are quantitative estimates.

2.1.2 Soil Organic Data Qualifiers

- The positive results reported for 4-methyl-2-pentanone in samples GL-SS-SB-8 (4-6) and GL-SS-SB-11 (0-2) are considered qualitatively invalid due to the levels at which this compound was present in associated laboratory method blanks and/or associated field quality control blanks. USEPA protocol requires that positive results for uncommon laboratory contaminants, such as 4-methyl-2-pentanone, that are less than or equal to five times the associated blank contamination levels to be considered qualitatively invalid. This has been indicated by placing "B" qualifiers next to the reported quantitative results for 4-methyl-2-pentanone for these soil samples on the data summary table.
- The samples listed on the table below were analyzed for volatile organic compounds, semivolatile organic compounds, and/or pesticide/PCB compounds at initial dilutions and/or according to medium-level sample preparation protocols because of suspected high levels of these compounds in the samples. The initial dilutions/medium-level protocols were required to prevent saturation of the instrument and to allow quantitation of the compounds within the linear range of the calibration curve. However, higher quantitation limits have resulted for specific volatile organic compounds, semivolatile organic compounds and/or pesticide/PCB compounds which were not detected in these samples. This should be noted when assessing these samples for the qualitative absence of specific volatile, semivolatile, and pesticide/PCB organic compounds.

Sample	Fraction	Dilution Factor
GL-SS-SB-1 (6-8)	VOAs	1X (Medium Level)
GL-SS-SB-2 (6-8)	VOAs SVOAs	2X (Medium Level) 2X
GL-SS-SB-4 (8-10)	VOAs SVOAs	1.7X (Medium Level) 20X
GL-SS-SB-4 (8-10) DUPE	VOAs SVOAs	1X (Medium Level) 25X
GL-SS-SB-11 (0-2)	VOAs SVOAs	14.3X (Medium Level) 400X
GL-SS-SB-12 (6-8)	VOAs	1.3X (Medium Level)

- Samples GL-SS-SB-12 (6-8) was re-analyzed at a dilution for semivolatile organic compounds. The dilution was required because the concentration of phenol detected in the initial analyses exceeded the linear range of the instrument. The dilution was performed to allow quantitation of this compound within the linear range of the calibration curve. Positive results for phenol in this sample has been reported from the diluted analyses. All other results and quantitation limits for this sample have been reported from the initial analyses.
- Results for phenol and isophorone were incorrectly reported as not-detected in samples GL-SS-SB-10 (6-8) and GL-SS-SB-5 (6-8), respectively. A review of the quantitation reports and mass spectra indicated that these compounds were detected at concentrations below the quantitation limit. The laboratory has confirmed these findings and has resubmitted analysis results reports for these samples. ERM has reported the results listed below for phenol and isophorone on the data summary table.

Sample	Compound	Laboratory Reported Quantitation Limit	Actual Concentration
GL-SS-SB-5(MW-2) (6-8)	Isophorone	410 U	76 J
GL-SS-SB-10 (6-8)	Phenol	400 U	130 J

- The positive results reported for bis(2-ethylhexyl)phthalate in samples GL-SS-SB-7 (6-8) and GL-SS-SB-7 (35-37) should be considered quantitative estimates. Poor relative response factor (RRF) precision (>30% relative standard deviation) in the initial calibration standards associated with these samples was observed for this compound. Poor initial calibration RRF precision indicates a lack of instrument stability for this compound. The reported results for bis(2-ethylhexyl)phthalate in these samples have been marked with "J" qualifiers on the data summary tables to indicate that they are quantitative estimates.
- The positive results for acetone in the samples listed below should be considered quantitative estimates. Poor relative response factor (RRF) precision (>25% difference) between the initial calibration average RRF and the continuing calibration response factor (RF) associated with these samples was observed for this compound. A lack of continuing calibration RF precision indicates instrument instability for this compound in associated samples. The positive results for acetone in these samples should be considered quantitative estimates. This has been indicated by placing "J" qualifiers next to the positive

results for this compound in these samples on the data summary table.

Samples Affected	
GL-SS-SB-3 (6-8), GL-SS-SB-8 (4-6), GL-SS-SB-12 (6-8), GL-SS-SB-13 (6-8) DUPE,	

- The quantitation limits associated with the volatile internal standard compound, chlorobenzene-d5, in samples GL-SS-SB-13 (6-8) DUPE and GL-SS-SB-9 (30-32) should be considered biased low quantitative estimates. The area counts for this volatile internal standard compound were below the quality control (QC) limit for the volatile organic compound analysis of these samples. The low area counts indicate the possible presence of matrix interferences in these samples. The laboratory did not re-analyze sample GL-SS-SB-9 (30-32) to confirm the low internal standard area. Analysis of the matrix spike/matrix spike duplicate of sample GL-SS-SB-13 (6-8) DUPE confirmed the low chlorobenzene-d5 response for this sample. The quantitation limits for volatile organic compounds associated with the low internal area in these samples should be considered quantitative estimates. This has been indicated by placing "J" qualifiers next to the affected quantitation limits on the data summary table.
- The positive results and/or quantitation limits for semivolatile organic compounds associated with the semivolatile internal standard compounds, chrysene-d₁₂ and perylene -d₁₂ in sample GL-SS-SB-11 (0-2) should be considered biased low quantitative estimates. The area counts for these semivolatile internal standard compounds were below the quality control (QC) limit for the semivolatile organic compound analysis of this sample. The low area counts indicate the possible presence of matrix interferences in these samples. The laboratory did not re-analyze sample GL-SS-SB-11 (0-2) to confirm the low internal standard areas. The positive results and/or quantitation limits for semivolatile organic compounds associated with the low internal areas in this sample should be considered quantitative estimates. This has been indicated by placing "J" qualifiers next to the affected positive results and/or quantitation limits on the data summary table.
- The quantitation limits reported for aroclor-1254 in samples GL-SS-SB-2 (6-8), GL-SS-SB-2 (30-32), GL-SS-SB-9 (4-6), GL-SS-SB-13 (6-8), and GL-SS-SB-13 (6-8) DUPE are biased low quantitative estimates. The pesticide/PCB surrogate compound

recoveries were below acceptance limits for the analysis of these samples. The low recoveries may be due to matrix interferences present in these samples that prevented the adequate recovery of the pesticide/PCB surrogate compounds. Quantitation limits for aroclor-1254 in samples GL-SS-SB-2 (6-8), GL-SS-SB-2 (30-32), GL-SS-SB-9 (4-6), GL-SS-SB-13 (6-8), and GL-SS-SB-13 (6-8) DUPE have been marked with "J" qualifiers on the data summary tables to indicate that they are quantitative estimates. The possibility of elevated quantitation limits should be noted when assessing the data for the qualitative absence of specific pesticides/PCB compounds.

- The recovery of the acid-extractable surrogate compounds in the semivolatile organic compound analysis of sample GL-SS-SB-8 (4-6) were below acceptance limits. The low recoveries may be due to laboratory extraction problems that prevented the adequate recovery of the acid-extractable semivolatile surrogate compounds. The laboratory's reextraction and reanalysis of the sample yielded acceptable surrogate recoveries. However, the reextraction was performed beyond holding time. Samples extracted outside the fourteen day holding time may be subject to biological or chemical degradation. The positive results and quantitation limits reported for semivolatile organic compounds in this sample have been reported from the re-extracted sample analysis. The positive results and quantitation limits should be considered quantitative estimates and may be higher than reported. This has been indicated by placing "I" qualifiers next to the positive results and quantitation limits for semivolatile organic compounds in this sample.
- The recovery of surrogate compounds in the pesticide/PCB compound analysis of sample GL-SS-SB-11(0-2) were below acceptance limits. The low recoveries may be due to laboratory extraction problems that prevented the adequate recovery of the pesticide/PCB surrogate compounds. The laboratory's re-extraction and reanalysis of the sample yielded acceptable surrogate recoveries. However, the reextraction was performed beyond holding time. Samples extracted outside the fourteen day holding time may be subject to biological or chemical degradation. The positive result reported for aroclor-1254 in this sample has been reported from the re-extracted sample analysis. The positive result should be considered a quantitative estimate and may be higher than reported. This has been indicated by placing a "J" qualifier next to the quantitative result for aroclor-1254 for this sample.
- The surrogate recoveries for the semivolatile organic compound analysis of soil samples GL-SS-SB-4 (8-10), GL-SS-SB-4 (8-10) DUPE, and GL-SS-SB-11 (0-2) and for the volatile organic compound analysis of sample GL-SS-SB-11 (0-2) could not be evaluated due to necessary

sample dilutions. The dilutions were required because of suspected high levels of target and/or non-target compounds present in the samples. However, these dilutions have resulted in low surrogate recoveries. Therefore, ERM was not able to evaluate the semivolatile or volatile organic analysis data for these samples based on surrogate recoveries. This should be noted when assessing samples for GL-SS-SB-4 (8-10), GL-SS-SB-4 (8-10) DUPE, and GL-SS-SB-11 (0-2) semivolatile organic compounds and GL-SS-SB-11 (0-2) for volatile organic compounds.

- Sample GL-SS-SB-13 (6-8) and its blind duplicate sample, GL-SS-SB-13 (6-8) DUPE were submitted to the laboratory to evaluate sampling and analytical precision for those compounds determined to be confidently detected. All compounds met ERM's blind duplicate precision criteria of 30% relative percent difference (RPD) for volatile organic compounds and 40% RPD for semivolatile organic compounds and pesticide/PCB compounds. The RPD was not calculated for the compounds that were detected in one sample at concentrations less than the quantitation limit but were not detected in the other sample.
- Sample GL-SS-SB-4 (8-10) and its blind duplicate sample, GL-SS-SB-4 (8-10) DUPE were submitted to the laboratory to evaluate sampling and analytical precision for those compounds determined to be confidently detected. All compounds met ERM's blind duplicate precision criteria of 30% relative percent difference (RPD) for volatile organic compounds and 40% RPD for semivolatile organic compounds and pesticide/PCB compounds with the exception of acetone in the volatiles analysis. The RPD was not calculated for the compounds that were detected in one sample at concentrations less than the quantitation limit but were not detected in the other sample.

The lack of precision for acetone may be due to the heterogeneity of the duplicate samples. This lack of precision is anticipated, however, as the results approach the limit of detection. The positive results for acetone in these samples should be considered quantitative estimates. This has been indicated by placing "J" qualifiers next to the reported positive results on the data summary tables.

2.1.3 Ground Water Organic Data Qualifiers

• The positive results and/or quantitation limits for acid-extractable semivolatile organic compounds in samples GL-WS-MW-8, GL-WS-DECON WATER should be considered biased low quantitative estimates and may be higher than reported. Low recoveries were obtained for acid-extractable surrogate compounds for these samples. The low recoveries may be the result of extraction inefficiencies and/or matrix interferences present in these samples.

The samples were re-extracted and re-analyzed with acceptable surrogate recoveries but outside of the holding time criteria. The results from the initial analysis of these samples have been reported on the data summary tables. Positive results and/or quantitation limits for acid-extractable semivolatile organic compounds in these samples should be considered biased low quantitative estimates. The positive results and/or quantitation limits for acid-extractable semivolatile organic compounds in these samples have been marked with "J" qualifiers on the data summary tables to indicate they are quantitative estimates. The elevated quantitation limits should be noted when assessing these samples for the qualitative absence of acid-extractable semivolatile organic compounds.

- The positive results and quantitation limits reported for pesticide/PCB compounds in samples GL-WS-MW-1 DUPE, GL-WS-MW-2, GL-WS-MW-3, GL-WS-MW-4, GL-WS-MW-5, GL-WS-MW-6, GL-WS-MW-7, and GL-WS-MW-8 are biased low quantitative estimates. The pesticide/PCB surrogate compound recoveries were below acceptance limits for the analysis of these samples. The low recoveries may be due to matrix interferences present in these samples that prevented the adequate recovery of the pesticide/PCB surrogate compounds. Positive results and/or quantitation limits for pesticide/PCB compounds in samples GL-WS-MW-1 DUPE, GL-WS-MW-2, GL-WS-MW-3, GL-WS-MW-4, GL-WS-MW-5, GL-WS-MW-6, GL-WS-MW-7, and GL-WS-MW-8 have been marked with "J" qualifiers on the data summary tables to indicate that they are quantitative estimates. The possibility of elevated quantitation limits should be noted when assessing the data for the qualitative absence of specific pesticide/PCB compounds in these samples.
- The samples listed on the table on Page 9 were analyzed for volatile and semivolatile organic compounds and pesticide/PCB compounds at initial dilutions and/or according to medium-level sample preparation protocols because of suspected high levels of these compounds in the samples. The initial dilutions/medium-level protocols were required to prevent saturation of the instrument, to improve chromatographic resolution, and to allow the quantitation of the compounds within the linear range of the calibration curve. However, higher quantitation limits have resulted for specific volatile and semivolatile organic compounds and pesticide/PCB compounds which were not detected in these samples. This should be noted when assessing these samples for the qualitative absence of specific volatile, semivolatile, and pesticide/PCB organic compounds.

Sample	Fraction	Dilution Factor
GL-WS-MW-5	VOAs	10X
	SVOAs	20X
	Pesticide/PCBs	100X
GL-WS-MW-6	VOAs	1X (Medium Level)
	SVOAs	800X
	Pesticide/PCBs	500X
GL-WS-MW-7	VOAs	500X
	SVOAs	200X
	Pesticide/PCBs	50X

- The surrogate recoveries for the semivolatile organic compound analysis of samples GL-WS-MW-6, GL-WS-MW-7 could not be evaluated due to necessary sample dilutions. The dilutions were required because suspected high levels of target and/or non-target compounds in the samples. However, these dilutions have resulted in low surrogate recoveries. Therefore, ERM was not able to evaluate the semivolatile analysis data for these samples based on surrogate recoveries. This should be noted when assessing samples for GL-WS-MW-6, GL-WS-MW-7 semivolatile organic compounds.
- Sample GL-WS-MW-6 was re-analyzed at a dilution and following medium level sample preparation protocols for volatile organic compounds because the concentration of acetone detected in the initial analysis exceeded the linear range of the instrument. The dilution/medium level protocols were required to prevent saturation of the instrument and to allow quantitation of this compound within the linear range of the calibration curve. However, the diluted reanalysis was performed outside of the analysis hold time. Samples analyzed outside the fourteen day holding time may be subject to biological or chemical degradation. The positive result for acetone reported from the diluted reanalysis should be considered a quantitative estimate. This has been indicated by placing a "J" qualifier next to the quantitative result for acetone in this sample. All other results and quantitation limits for this sample has been reported from the initial analyses.
- Sample GL-WS-MW-1 and its blind duplicate sample,
 GL-WS-MW-1 DUPE were submitted to the laboratory to evaluate
 sampling and analytical precision for those compounds determined to
 be confidently detected. All compounds met ERM's blind duplicate
 precision criteria of 20% relative percent difference (RPD) for volatile
 organic compounds and 25% RPD for semivolatile and pesticide/PCB
 compounds. The RPD was not calculated for the compounds that

were detected in one sample at concentrations less than the quantitation limit but were not detected in the other sample.

INORGANIC DATA

3.0

The inorganic analyses of the ground water and soil samples and their associated field quality control samples were performed by Quanterra Environmental Services of North Canton, Ohio. These samples were analyzed for Priority Pollutant List (PPL) metals, as indicated in Table 1-1. The sample analyses were performed according to the protocols specified in "Test Methods for Evaluating Solid Waste", SW-846, Third Edition, September 1994. The methods used for these analyses are summarized and referenced in Attachment 1.

The findings in this report are based on a review of the data generated according to a full data deliverables format. The following deliverables were evaluated for conformance with criteria: chain of custody documentation, holding times, laboratory preparation and calibration blank results, equipment blank results, matrix spike recoveries, laboratory and field duplicate analysis results, detection limits/sensitivity, initial and continuing calibrations, laboratory control sample results, Inductively Coupled Plasma (ICP) Emission Spectroscopy, interference check sample results, ICP serial dilution results, Graphite Furnace Atomic Absorption (GFAA) Spectroscopy post-digestion spike recoveries, and standard addition results.

The inorganic analyses were performed acceptably, but require qualifying statements. It is recommended that the analytical results be used only with the qualifying statements presented below. Any aspects of the data which are not discussed in this report should be considered qualitatively and quantitatively valid, as reported, based on the deliverables reviewed. Data summary tables presenting the validated and qualified results are provided in Attachment 2.

3.1 INORGANIC DATA QUALIFIERS

3.1.1 Soil Inorganic Data Qualifiers

• The positive results and/or detection limits reported for antimony, arsenic, beryllium, lead, and selenium in the samples listed below should be considered biased low quantitative estimates and may be higher than reported. The associated matrix spike recoveries were below the established quality control (QC) limit for these analytes. The low recoveries indicate the presence of matrix interferences in samples of a similar matrix. This has been indicated by placing "J" qualifiers next to the positive results and/or detection limits for these

analytes on the data summary tables for these samples. The possibility of elevated detection limits should be noted when assessing the data for the qualitative absence of antimony, arsenic, beryllium, lead, and selenium in these samples.

Analyte	Samples Affected
Antimony	GL-SS-BG-1 (0.5-1), GL-SS-BG-1 (0.5-1) DUPE,
•	GL-SS-BG-1 (1.5-2), GL-SS-BG-2 (0.5-1), GL-SS-BG-2 (1.5-2),
	GL-SS-BG-3 (0.5-1), GL-SS-BG-3 (1.5-2), GL-SS-BG-4 (0.5-1),
	GL-SS-BG-4 (1.5-2), GL-SS-BG-5 (0.5-1), GL-SS-BG-5 (1.5-2),
	GL-SS-BG-6 (0.5-1), GL-SS-BG-6 (1.5-2), GL-SS-BG-7 (0.5-1),
	GL-SS-BG-7 (0.5-1) DUPE, GL-SS-BG-7 (1.5-2),
	GL-SS-BC-8 (0.5-1), GL-SS-BC-8 (1.5-2)
Arsenic	GL-SS-BG-1 (0.5-1), GL-SS-BG-1 (0.5-1) DUPE,
	GL-SS-BG-1 (1.5-2), GL-SS-BG-2 (0.5-1), GL-SS-BG-2 (1.5-2),
	GL-SS-BG-3 (0.5-1), GL-SS-BG-3 (1.5-2), GL-SS-BG-4 (0.5-1),
	GL-SS-BG-4 (1.5-2), GL-SS-BG-5 (0.5-1), GL-SS-BG-5 (1.5-2),
	GL-SS-BG-6 (0.5-1), GL-SS-BG-6 (1.5-2), GL-SS-BG-7 (0.5-1),
	GL-SS-BG-7 (5-1) DUPE, GL-SS-BG-7 (1.5-2),
	GL-SS-BG-8 (0.5-1), GL-SS-BG-8 (1.5-2)
Beryllium	GL-SS-BG-1 (0.5-1), GL-SS-BG-1 (0.5-1) DUPE,
•	GL-SS-BC-1 (1.5-2), GL-SS-BG-2 (0.5-1), GL-SS-BG-2 (1.5-2),
	GL-SS-BG-3 (0.5-1), GL-SS-BG-3 (1.5-2), GL-SS-BG-4 (0.5-1),
	GL-SS-BG-4 (1.5-2), GL-SS-BG-5 (0.5-1), GL-SS-BG-5 (1.5-2)
Lead	GL-SS-BG-1 (0.5-1), GL-SS-BG-1 (0.5-1) DUPE,
	GL-SS-BG-1 (1.5-2), GL-SS-BG-2 (0.5-1), GL-SS-BG-2 (1.5-2),
	GL-SS-BG-3 (0.5-1), GL-SS-BG-3 (1.5-2), GL-SS-BG-4 (0.5-1),
	GL-SS-BG-4 (1.5-2), GL-SS-BG-5 (0.5-1), GL-SS-BG-5 (1.5-2)
Selenium	GL-SS-BG-1 (0.5-1), GL-SS-BG-1 (0.5-1) DUPE,
	GL-SS-BG-1 (1.5-2), GL-SS-BG-2 (0.5-1), GL-SS-BG-2 (1.5-2),
	GL-SS-BG-3 (0.5-1), GL-SS-BG-3 (1.5-2), GL-SS-BG-4 (0.5-1),
	GL-SS-BG-4 (1.5-2), GL-SS-BG-5 (0.5-1), GL-SS-BG-5 (1.5-2),
	GL-SS-BG-6 (0.5-1), GL-SS-BG-6 (1.5-2), GL-SS-BG-7 (0.5-1),
	GL-SS-BG-7 (5-1) DUPE, GL-SS-BG-7 (1.5-2),
	GL-SS-BG-8 (0.5-1), GL-SS-BG-8 (1.5-2)
_	

The positive results and/or detection limits reported for thallium in the samples listed on Page 13 should be considered biased low quantitative estimates due to negative results reported in the laboratory preparation and/or calibration blanks. The negative blanks indicate the probability of underestimation of the analyte concentration by the instrument. The positive results and/or detection limits for thallium have been marked with "J" qualifiers on the data summary tables to indicate that they are biased low quantitative estimates. The possibility of elevated detection limits should be noted when assessing the data for the qualitative absence of thallium in these samples.

Analyte	Samples Affected
Thallium	GL-SS-BG-1 (0.5-1), GL-SS-BG-1 (0.5-1) DUPE, GL-SS-BG-1 (1.5-2), GL-SS-BG-2 (0.5-1), GL-SS-BG-2 (1.5-2), GL-SS-BG-3 (0.5-1), GL-SS-BG-3 (1.5-2), GL-SS-BG-4 (0.5-1), GL-SS-BG-4 (1.5-2), GL-SS-BG-5 (0.5-1), GL-SS-BG-5 (1.5-2)

• The positive results reported for copper and zinc in the samples listed below should be considered quantitative estimates. The ICP serial dilution analysis results associated with this sample exceeded the established precision criteria of 10 percent difference for these analytes. The poor precision indicates the possible presence of physical or chemical interference in the analysis of copper and zinc for samples of a similar matrix. This has been indicated by placing "J" qualifiers next to the reported quantitative results for the copper and zinc in these samples.

Analyte	Samples Affected
Copper	GL-SS-BG-6 (0.5-1), GL-SS-BG-6 (1.5-2), GL-SS-BG-7 (0.5-1),
	GL-SS-BG-7 (0.5-1) DUPE, GL-SS-BG-7 (1.5-2),
	GL-SS-BG-8 (0.5-1), GL-SS-BG-8 (1.5-2)
Zinc	GL-SS-BG-1 (0.5-1), GL-SS-BG-1 (0.5-1) DUPE,
	GL-SS-BG-1 (1.5-2), GL-SS-BG-2 (0.5-1), GL-SS-BG-2 (1.5-2),
	GL-SS-BG-3 (0.5-1), GL-SS-BG-3 (1.5-2), GL-SS-BG-4 (0.5-1),
	GL-SS-BG-4 (1.5-2), GL-SS-BG-5 (0.5-1), GL-SS-BG-5 (1.5-2),
	GL-SS-BG-6 (0.5-1), GL-SS-BG-6 (1.5-2), GL-SS-BG-7 (0.5-1),
	GL-SS-BG-7 (0.5-1) DUPE, GL-SS-BG-7 (1.5-2),
	GL-SS-BG-8 (0.5-1), GL-SS-BG-8 (1.5-2)

• Sample GL-SS-BG-7 (0.5-1) and its blind duplicate sample and GL-SS-BG-7 (0.5-1) DUPE were submitted to the laboratory to evaluate sampling and analytical precision for those analytes determined to be confidently detected. All analytes met ERM's blind duplicate precision criteria of 40% relative percent difference (RPD) for metals with the exception of lead and nickel. The RPD was not calculated for the compounds that were detected in one sample but were not detected in the other sample.

The lack of precision for lead and nickel may be due to instrumental instability or sample heterogeneity. This lack of precision is anticipated, however, as the results approach the limit of detection. Positive results for these analytes in the samples listed on Page 14 should be considered quantitative estimates. This has been indicated by placing "J" qualifiers next to the positive results for these analytes on the data summary tables for these samples.

Analyte	Samples Affected
Lead	GL-SS-BG-6 (0.5-1), GL-SS-BG-6 (1.5-2), GL-SS-BG-7 (0.5-1),
	GL-SS-BG-7 (0.5-1) DUPE, GL-SS-BG-7 (1.5-2),
	GL-SS-BG-8 (0.5-1), GL-SS-BG-8 (1.5-2)
Nickel	GL-SS-BG-6 (0.5-1), GL-SS-BG-6 (1.5-2), GL-SS-BG-7 (0.5-1),
	GL-SS-BG-7 (0.5-1) DUPE, GL-SS-BG-7 (1.5-2),
	GL-SS-BG-8 (0.5-1), GL-SS-BG-8 (1.5-2)

3.1.2 Ground Water Inorganic Data Qualifiers

- The detection limit for thallium in sample GL-WS-DECON WATER should be considered a biased low quantitative estimate due to negative results reported in laboratory blanks. The negative blanks indicate the probability of underestimation of the analyte concentration by the instrument. The detection limit for thallium has been marked with a "J" qualifier on the data summary tables to indicate that it is a biased low quantitative estimate. The possibility of an elevated detection limits should be noted when assessing the data for the qualitative absence of thallium in this sample.
- The detection limits reported for selenium in samples GL-WS-MW-1, GL-WS-MW-1 DUPE, GL-WS-MW-2, GL-WS-MW-3, GL-WS-MW-4, GL-WS-MW-5, GL-WS-MW-6, GL-WS-MW-7, GL-WS-MW-8, and GL-WS-DECON WATER should be considered biased low quantitative estimates and may be higher than reported. The associated matrix spike recovery was below the established quality control (QC) limit for this analyte. The low recovery indicates the presence of matrix interferences in samples of a similar matrix. This has been indicated by placing "J" qualifiers next to the detection limits for selenium on the data summary tables for these samples. The possibility of elevated detection limits should be noted when assessing the data for the qualitative absence of selenium in these samples.
- Sample GL-WS-MW-1 and its blind duplicate sample,
 GL-WS-MW-1 DUPE were submitted to the laboratory to evaluate
 sampling and analytical precision for those analytes determined to be
 confidently detected. All analytes met ERM's blind duplicate
 precision criteria of 25% relative percent difference (RPD) for metals.
 The RPD was not calculated for the analytes that were detected in one
 sample but were not detected in the other sample.

4.0 SUMMARY

The organic and inorganic analyses were performed acceptably, but required a few qualifying statements. This analytical quality assurance report has identified the aspects of the data which required qualification. A support documentation package has been prepared for this quality assurance review and is located with the Lubrizol Corporation project file.

Attachment 1 Analysis Method References and Summaries

METHODOLOGY SUMMARY

Analysis for Volatile Organic Compounds by GC/MS

The samples were analyzed for volatile organic compounds by adding 5 milliliter (mL) water or 5 gram aliquots to 5 mL reagent water containing surrogate compounds and internal standards and purging the mixture with helium at ambient temperature. The volatile compounds were transferred from the aqueous phase to the vapor phase and trapped onto a sorbent column. After purging, the column was heated and back-flushed to desorb the compounds onto a gas chromatographic column. The gas chromatograph was temperature programmed to separate the sample components, which were then detected by a mass spectrometer. The target compounds were qualitatively identified and quantitated through calibration with standards.

Analysis for Semivolatile Organic Compounds by GC/MS

Aqueous sample aliquots are acidified to pH 2 and extracted with 1:1 methylene chloride using a continuous liquid-liquid extractor. Thirty grams of soil sample are extracted with 1:1 methylene chloride using a sonicator. The methylene chloride extract is dried and concentrated to a final volume of 1 ml. The extract is decanted and filtered. The extract is then analyzed by first separating the extract components using a gas chromatographic column and then detecting them with a mass spectrometer for qualitative and quantitative evaluation.

Analysis for Pesticides/PCB Compounds

Thirty grams (wet weight) of the soil or 1,000 mL of water sample are extracted with 1:1 methylene chloride and acetone by sonic disruption. The extract is decanted and filtered. The extraction is repeated two or more times, decanting after each sonication. The extract is then concentrated and analyzed by first separating the extract components using a gas chromatographic column and then detecting them with an electron capture detector (ECD).

Florisil cleanup is performed on the chromatographic column prior to the sample analysis.

Analysis for ICP Metals

Prior to analysis, 100- milliliter or one gram sample aliquots were digested with nitric and hydrochloric acids for aqueous analysis. The solution resulting from the metals digestion was analyzed by Inductively Coupled Plasma (ICP) Emission Spectroscopy.

Analysis for Antimony, Arsenic, Selenium, and Lead

One hundred- milliliter sample or one gram sample aliquots were digested with nitric and hydrogen peroxide for aqueous analysis. The resulting solutions were analyzed by graphite furnace atomic absorption (GFAA).

Analysis for Mercury

Aqueous and solid samples analyzed for mercury were oxidized with potassium permanganate. Mercury was reduced to its elemental form and aerated from solution in a closed system. Mercury was then determined with a cold vapor atomic absorption spectrophotometer.

METHOD REFERENCES

Analysis	References
Volatile Organic Compounds	Test Methods for Evaluating Solid Wastes, SW-846, 3rd Edition, (USEPA 1994), Method 8240A.
Semivolatile Organic Compounds	Test Methods for Evaluating Solid Wastes, SW-846, 3rd Edition, (USEPA 1994), Method 8270A.
Organochlorine Pesticide/PCBs	Test Methods for Evaluating Solid Wastes, SW-846, 3rd Edition, (USEPA 1994), Method 8080.
PPL Metals	Test Methods for Evaluating Solid Wastes, SW-846, 3rd Edition, (USEPA 1994), Methods 6010A, 7060, 7071, 7421, 7470, 7740, and 7841.

Attachment 2 Data Summary Tables

Indicator Chemicals List Volatile Organic Compounds Soil Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-SS-SB	-1	GL-SS-SB	-2	GL-SS-SI	B-2	GL-SS-SE	3-3	GL-SS-SB	-4
DEPTH:		6-8	- 1	6-8		30-32	.	6-8	j	8-10	
DATE COLLECTED:		7/1/96	1	7/9/96		7/11/9	6	7/1/96	,	6/27/9	ó
MOISTURE CONTENT:		83.3		81.7	i	83.1	i	85.6	ľ	81.1	
MATRIX:		SOLID		SOLID	i	SOLID)	SOLID	·l	SOLID	
ANALYTE	UNITS										
Vinyl chloride	μg/kg	1500	ប	3100	υ	12	ַ ט	12	υl	2600	U
Acetone	μg/kg	3000	ប	8400		8.6	J [63	J	19000	J
Carbon disulfide	μg/kg	750	ប	1500	บ (6.0	ַ ט (5.8	υl	1300	U
1,1-Dichloroethene	μg/kg	750	ប	1500	υ	6.0	ַ ט	5.8	บ	1300	U
cis-1,2-Dichloroethene	μg/kg	380	ប	760	ַ ט	3.0	υļ	2.9	טן	640	U
trans-1,2-Dichloroethene	μg/kg	380	U	760	บ	3.0	ַ ט	2.9	ַ ט	640	U
2-Butanone	μg/kg	3000	ប	6100	ַ ט	24	ַ ט	23	บ	5100	U
Trichloroethene	μg/kg	75 0	บ	1500	บ	6.0	ַ ט	5.8	υļ	1300	U
Benzene	μg/kg	750	บ	1500	ַ ט	6.0	ַ ט	3.9	J	1300	U
4-Methyl-2-pentanone	μg/kg	10000		50000	ļ	24	U	23	υļ	39000	
Toluene	μg/kg	<i>7</i> 50	บ	1500	ן ט	6.0	υ	5.8	υ	1300	U
Ethylbenzene	μg/kg	750	U	1500	ַ ט	6.0	ן ט	5.8	ן ט	1300	U
Styrene	μg/kg	750	บ	1500	υ	6.0	บ	5.8	ע	1300	U
Xylenes (total)	μg/kg	750	U	1500	บ	6.0	ַ ט	5.8	υ	1300	U

- J This result should be considered a quantitative estimate.
- B This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration.
- U This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.
- UJ This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate.

NA - Not Analyzed

Approved for Quality
Assessed Release by:

Mar. 0

Date 9/11/96

Indicator Chemicals List Vocatile Organic Compounds Soil Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

DEPTH: DATE COLLECTED: MOISTURE CONTENT:	}	8-10 6/27/96		6-8							
		6/27/04		00	1	34-36		4-6	1	6-8	
MOISTIRE CONTENT:		0/2//70		6/26/90	6	7/10/9	6	7/1/96	,]	6/25/9	6
MODICINE CONTENTS	1	81.7		80.8	1	86.8	ļ	86.7	j	82.5	
MATRIX:		SOLID		SOLID	·	SOLID		SOLID	·	SOLID)
ANALYTE U	NITS				1						
Vinyl chloride μ	g/kg	1500	U	12	ט	12	υ	12	υl	12	U
Acetone µ	g/kg	27000	j	13	J {	14	3	23	ט	10	j
Carbon disulfide μ	g/kg	760	U	6.2	υ	5.8	U	5.8	υ	6.1	U
1,1-Dichloroethene µ	g/kg	760	U	6.2	υ [5.8	υ	5.8	υ	6.1	U
cis-1,2-Dichloroethene μ	g/kg	380	U	3.1	ט	2.9	υ	2.9	บ	3.0	U
trans-1,2-Dichloroethene µ	g/kg	380	U	3.1	υ	2.9	υ	2.9	บ	3.0	บ
2-Butanone μ	g/kg	3100	U	25	ט	23	υ	23	ט	24	U
Trichloroethene μ	g/kg	760	U	6.2	υÌ	5.8	υ	5.8	บ	6.1	U
Benzene µ	g/kg	760	U	4.0	J	5.8	ט	5.8	υ	6.1	U
4-Methyl-2-pentanone μ	g/kg	30000		25	บ	23	υ	23	U	24	U
Toluene µ	g/kg	760	U	6.2	υ	5.8	ַ ט	5.8	υ	6.1	U
Ethylbenzene д	g/kg	760	U	6.2	υ	5.8	υļ	5.8	บ	6.1	U
St yrene	g/kg	760	U	6.2	υ	5.8	ט	5.8	ט (6.1	υ
	g/kg	760	U	6.2	υ	5.8	U	5.8	ַ ט	6.1	υ

- J This result should be considered a quantitative estimate.
- B This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration.
- U This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.
- UJ This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate.

NA - Not Analyzed

Approved for Quality
American Release by:

Bev.

Date 9/17/96

Indicator Chemicals List Voiatile Organic Compounds Soil Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-SS-SB	-7	GL-SS-SE	3-8	GL-SS-S	B-9	GL-SS-SE	3-9	GL-SS-SE	3-10
DEPTH:		35-37	i	4-6		4-6	ľ	30-32	į	6-8	
DATE COLLECTED:		6/25/90	5	6/27/9	6	7/9/9	6 [7/11/9	6	6/28/9	7 6
MOISTURE CONTENT:		85.2	i	82.9	1	82	·	87.6		81.8	
MATRIX:		SOLID		SOLID)	SOLI)	SOLIE		SOLIT)
ANALYTE	UNITS										
Vinyl chloride	μg/kg	12	U	12	υ	12	บ (11	ប	12	ប
Acetone	μg/kg	23	บ	48	J	18	J	19	J	14	J
Carbon disulfide	μg/kg	5.9	υ	6.0	ע	6.1	ับ	5.7	U	6.1	υ
1,1-Dichloroethene	μg/kg	5.9	υ	6.0	U	6.1	ប	5.7	บ	6.1	บ
cis-1,2-Dichloroethene	μg/kg	2.9	บ	3.0	ן ט	3.0	ַ ט	2.9	บ	3.1	ט
trans-1,2-Dichloroethene	μg/kg	2.9	บ	3.0	ן ט	3.0	ַ ע	2.9	U	3.1	U
2-Butanone	μg/kg	23	บ	24 -	ן ט	24	ַ ע	23	บ	24	บ
Trichloroethene	μg/kg	5.9	U	6.0	ן ט	6.1	ַ ט	5.7	U	6.1	บ
Benzene	μg/kg	5.9	υ	6.0	ָ ט	6.3	- 1	5.7	U	28	l
4-Methyl-2-pentanone	μg/kg	23	บ	7.7	В	24	ប	23	U J	6.3	J
Toluene	μg/kg	5.9	ប	6.0	บ	6.1	ט	5.7	IJ	6.1	บ
Ethylbenzene	μg/kg	5.9	ប	6.0	ַ ט	6.1	บ	5.7	UJ	6.1	U
Styrene	μg/kg	5.9	บ	6.0	บ	6.1	ן ט	5.7	ប្យ	6.1	ַ ט
Xylenes (total)	μg/kg	5.9	บ	6.0	ט	6.1	บ	5.7	UJ	6.1	U

- J This result should be considered a quantitative estimate.
- B This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration.
- U This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.
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NA - Not Analyzed

Approved for Quality

Asserted Police by:

O

Date 9(1)(96

VOA/S/Comb.

Indicator Chemicals List Volatile Organic Compounds Soil Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION: DEPTH: DATE COLLECTED: MOISTURE CONTENT: MATRIX:		GL-SS-SB- 0-2 6/27/96 77 SOLID		GL-SS-SB- 6-8 6/24/96 81.6 SOLID		GL-SS-SB- 6-8 7/2/96 84.7 SOLID	13	GL-SS-SB-13 6-8 7/2/96 81.8 SOLID	
ANALYTE	UNITS				į				
Vinyl chloride	μg/kg	23000	U	2000	υ [12	υl	12	υ
Acetone	μg/kg	46000	υ	5800	j }	9.1	1	41	j
Carbon disulfide	μg/kg	12000	υ	1000	υ	5.9	υļ	6.1	U
1,1-Dichloroethene	μg/kg	12000	υ	1000	U	5.9	υ	6.1	U
cis-1,2-Dichloroethene	μg/kg	5800	υ	510	บ [3.0	U	3.1	U
trans-1,2-Dichloroethene	μg/kg	5800	U	510	u	3.0	υ	3.1	U
2-Butanone	µg/kg	46000	υ	4100	U	24	U	24	U
Trichloroethene	μg/kg	12000	υ	1000	υ	5.9	υ	6.1	U
Benzene	μg/kg	12000	υ	1000	υ (5.9	บ	6.1	U
4-Methyl-2-pentanone	μg/kg	40000	В	40000	Į	24	υ	24	U
Toluene	μg/kg	85000	}	1000	υ	5.9	υļ	6.1	U
Ethylbenzene	µg/kg	48000		1000	υ	5.9	υ	6.1	U
Styrene	μg/kg	12000	υ (1000	U	5.9	U	6.1	υ
Xylenes (total)	μg/kg	250000	1	1000	υ	5.9	ט	6.1	U

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NA - Not Analyzed

Approved for Quality	
Assurance Release by:	v. <u>6</u>
	Date 9/17/56

Indicator Chemicals List Semivolatile Organic Compounds Soil Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-SS-SB	-1	GL-SS-SB	-2	GL-SS-S	B-2	GL-SS-SE	B-3	GL-SS-SB	4	GL-SS-SB-4 D	UPE	GL-SS-SB-5 (1	MW-2)
DEPTH (Feet):		6-8	j	6-8		30-32	:	6-8	·	8-10		8-10		6-8	1
DATE COLLECTED:	ļ	7/1/96	1	7/9/96	- {	7/11/9	6	7/1/96	5	6/27/96	,	6/27/ 96	•	6/26/9	6
MOISTURE CONTENT:	Į	83.3		81.7		83.1	ŀ	85.6		81.1	Ī	81.7		80.8	- 1
MATRIX:		SOLID		SOLID		SOLIE		SOLID)	SOLID		SOLID		SOLID	ı J
ANALYTE	UNITS														
Phenol	μg/kg	1400		6100		400	υ	390	υ	52000		63000		410	U
2-Methylphenol	μg/kg	40	1	810	υ	400	υ	390	υ	8100	υ	10000	U	410	υ
4-Methylphenol	μg/kg	170	J	810	υ	400	ן ט	390	U	8100	บ	10000	U	410	υ [
Isophorone	μg/kg	400	U	810	บ	400	υ	390	υ	8100	υ	10000	U	76	J
Naphthalene	μg/kg	400	ָ ט	810	υ	400	υļ	390	υ	8100	υ	10000	U	410	υ
2-Methylnaphthalene	μg/kg	400	υ	810	U	400	บ	390	υ	8100	υ	10000	U	410	υ
Phenanthrene	μg/kg	400	υ	810	υ	400	υ	390	U	8100	υ	10000	U	410	υ
Di-n-butyl phthalate	μg/kg	400	υ	810	י ט	400	υ	390	υ	8100	υ	10000	U	410	บไ
Butyl benzyl phthalate	μg/kg	400	υ	810	υ	400	υ	390	υ	8100	บ	10000	U	410	ט
bis(2-Ethylhexyl) phthalate	μg/kg	400	υ	810	υ	400	ט	40	J	8100	ט	10000	Ü	1600	Ì
1,4-Dichlorobenzene	μg/kg	400	υ	810	บ	400	υ	390	บ	8100	υ	10000	U	410	ប
1,2-Dichlorobenzene	μg/kg	400	ប	810	υ	400	υ	390	บ	8100	บ	10000	U	410	ט
2,4-Dimethylphenol	μg/kg	400	ប	810	υ	400	υ	390	U	8100	υ	10000	υ	410	υ
1,2,4-Trichlorobenzene	μg/kg	400	υ	810	υ	400	ับ	390	บ	8100	U	10000	U	410	U

- J This result should be considered a quantitative estimate.
- B This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration.
- U This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.
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- NA Not Analyzed

Approved for Quality
Assurance Release by:

M. Com Rev. 0

Date 9/17/76

8 voes/5/Comb

Indicator Chemicals List Semivutatile Organic Compounds Soil Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:	- · · · · J	GL-96-58	-5	GL-95-SE	1-6	GL-SS-SE	-7	GL-SS-SB	-7	GL-SS-SB	8	GL-SS-SE	3-9
DEPTH (Feet):	1	34-36	- (4-6	ſ	6-8		35-37	į	4-6	1	4-6	
DATE COLLECTED:	1	7/10/90	.	7/1/96	,	6/25/9	6	6/25/96	5	6/27/9	5	7/9/96	.
MOISTURE CONTENT:	}	86.8	1	86.7		82.5		85.2	1	82.9	l	82	
MATRIX	{	SOLID	l l	SOLID	· }	SOLID	, ,	SOLID		SOLID	ŀ	SOLID)
ANALYTE	UNITS		- 1		(į		1				
Phenol	μg/kg	380	υ	380	υ	400	υ	390	υ	400	ប្យ	400	U
2-Methylphenol	μg/kg	380	υ	380	υļ	400	υ	390	υ	400	υj	400	υ
4-Methylphenol	μg/kg	380	υ (380	υĺ	400	υl	390	U	400	UJ [400	υ
Isophorone	μg/kg	380	υ	100	3	400	υ	390	υ	400	υj	400	U
Naphthalene	μg/kg	380	υl	380	υ	400	υ	390	υ	400	υj	400	υ
2-Methylnaphthalene	μg/kg	380	υ	380	υ	400	υl	390	υ	400	UJ	400	U
Phenanthrene	μg/kg	380	υl	380	υl	400	υ	390	υ	400	U) [400	υ
Di-n-butyl phthalate	μg/kg	380	υ	380	υ	400	U	390	υ	400	υj	400	U
Butyl benzyl phthalate	μg/kg	380	υl	380	υ	400	υ	390	υl	400	UJ	400	υ
bis(2-Ethylhexyl) phthalate	μg/kg	380	ט	380	υİ	850	J İ	390		270	, ,	400	U
1,4-Dichlorobenzene	μg/kg	380	υ	380	υ	400	υl	390	υl	400	ហ	400	υ
1,2-Dichlorobenzene	μg/kg	380	υl	380	υ	400	υİ	390	υİ	400	υj	400	υ
2,4-Dimethylphenol	µg/kg	380	υ	380	υ	400	υļ	390	υ	400	υj	400	υ
1,2,4-Trichlorobenzene	μg/kg	380	υl	380	υl	400	υÌ	390	υ	400	ן נט	400	ប

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NA - Not Analyzed

Approved for Quality
Assurance Release by:

Opposite 9/17/96

Indicator Chemicals List Semi-Jatile Organic Compounds Soil Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:	T	GL-SS-SE	1-9	GL-SS-SB	-10	GL-SS-SB	-11	GL-SS-SB	-12	GL-SS-SB	-13	GL-SS-SB-13	DUPE
DEPTH (Feet):		30-32	1	6-8		0-2		6-8	ł	6-8		6-8	
DATE COLLECTED:		7/11/9	6	6/28/9	6	6/27/96	6	6/24/9	6	7/2/96		7/2/9	6
MOISTURE CONTENT:	Ì	87.6	ŀ	81.8		<i>7</i> 7		81.6	- 1	84.7		81.8	1
MATRIX:		SOLID	· 1	SOLID) <u> </u>	SOLID	_	SOLID)	SOLID		SOLIE)
ANALYTE	UNITS												
Phenol	μg/kg	380	υ	130	<i>j</i>]	170000	U	26000	}	390	υ	400	υ
2-Methylphenol	μg/kg	380	υ	400	บ	170000	ט	630	1	390	U	400	υ
4-Methylphenol	μg/kg	380	ַ ט	400	ע	170000	U	310	J	390	U	400	υ
Isophorone	μg/kg	380	υļ	400	ן ט	170000	ָ ע	400	υ	390	U	400	U
Naphthalene	μg/kg	380	υļ	400	ט	26000	J	400	υ	390	υ	400	U
2-Methylnaphthalene	μg/kg	380	ט	400	บ (26000	J	400	ן ט	390	U	400	υ
Phenanthrene	μg/kg	380	υ	400	ט	170000	บ	400	บ	390	U	400	U
Di-n-butyl phthalate	μg/kg	380	บ	400	บ	170000	บ	400	υ	390	U	400	U
Butyl benzyl phthalate	μg/kg	380	υ	400	υ	170000	UJ	400	ט	390	U	400	U
bis(2-Ethylhexyl) phthalate	μg/kg	380	ט	370	3	510000	J	120	J	160	J	61	J
1,4-Dichlorobenzene	μg/kg	380	ט	400	υ	1 7 0000	υ	400	υ)	390	U	400	υ
1,2-Dichlorobenzene	μg/kg	380	ט	400	บ	39000	J	400	ט	390	U	400	U
2,4-Dimethylphenol	μg/kg	380	υ	400	บ	170000	Ü	400	υ	390	U	400	U
1,2,4-Trichlorobenzene	μg/kg	380	U	400	U	58000		400	U	390	U	400	U

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NA - Not Analyzed

Approved for Quality
Assurance Release by:

Jay Cen Rev. 0

Date 9/17/56

Aroclor-1254 Soil Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION: DEPTH (Feet): DATE COLLECTED: MOSITURE CONTENT: MATRIX:		GL-SS-SB-1 6-8 7/1/96 83.3 SOLID		GL-SS-SB- 6-8 7/9/96 81.7 SOLID		GL-SS-SB 30-32 7/11/96 83.1 SOLID	s	GL-SS-S 6-8 7/1/9 85.6 SOLII	6	GL-SS-S 8-10 6/27/9 81.1 SOLIE)6
ANALYTE	UNITS										
Aroclor 1254	μg/kg	40	υ	40	UJ	40	UJ	39	υ	41	υ

- J This result should be considered a quantitative estimate.
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- NA Not Analyzed.

Approved for Quality
Assurance Release by:

Per.

Date 9/17/54

Aroclor-1254 Soil Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-SS-SB-4 DUI	PE	GL-SS-SB-5 (MW-2)	GL	-SS-SB-5	5	GL-SS-	-SB-6	GL-SS	S-SB-7
DEPTH (Feet):	j	8-10		6-8	Ì	34-36	ł	4-	6	6	-8
DATE COLLECTED:		6/27/96		6/26/96	7.	/10/96	ł	7/1/	'96	6/25	5/96
MOSITURE CONTENT:		81.7		80.8	ĺ	86.8		86.	7	82	2.5
MATRIX:		SOLID		SOLID	5	OLID		SOL	.ID	SO	LID
ANALYTE	UNITS										
Aroclor 1254	μg/kg	40	υ	41 U	3	8	υ	38	υ	40	υ

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NA - Not Analyzed.

Approved for Quality
Assurance Release by:

The Rev. Date 7/17/84

Pes/S/Comb. 9/17/96

Arocior-1254 Soil Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION: DEPTH (Feet): DATE COLLECTED: MOSITURE CONTENT: MATRIX: ANALYTE	UNITS	GL-SS-SB- 35-37 6/25/96 85.2 SOLID	- 1	GL-SS-SB-4-6 4-6 6/27/96 82.9 SOLID		GL-SS-SB 4-6 7/9/96 82 SOLID		GL-SS-S 30-32 7/11/9 87.6 SOLII	? 96	GL-SS-SE 6-8 6/28/9 81.8 SOLIE	96
Aroclor 1254	μg/kg	39	U	40	U	40	UJ	38	U	40	υ

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- NA Not Analyzed.

Approved for Quality Assurance Release by:	
Kylem Rev.	<u></u>
10	Date 9/17/16

Aroclor-1254 Soil Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-SS-SB-	11	GL-SS-SB-	-12	GL-SS-SB	-13	GL-SS-SB-13	DUPE
DEPTH (Feet):	Ì	0-2		6-8	,	6-8		6-8	
DATE COLLECTED:		6/27/ 9 6	}	6/24/90	6	7/2/96	}	7/2/96	5
MOSITURE CONTENT	:	77		81.6	}	84.7		81.8	
MATRIX:		SOLID		SOLID)	SOLID		SOLIE)
ANALYTE	UNITS								
Aroclor 1254	μg/kg	2.7	J	40	บ	39	UJ	40	UJ

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NA - Not Analyzed.

Approved for Quality
Assurance Release by:

Page Rev.

Date 9/17/76

SAMPLE LOCATION:	<u>-</u>	GL-WS-M	W-1	GL-WS-M	W-1	CL-WS-M	W-2	GL-WS-M	W-3	GL-WS-M	W-4
	ĺ		- 1	DUPE	- (•				
DATE COLLECTED:		7/24/9	6	7/24/9	6	7/23/9	6	7/24/9	6	7/22/9	
MOISTURE CONTENT:		N/A	- 1	N/A	ł	N/A	ľ	N/A		N/A	
MATRIX:		WATE	R	WATE	<u> </u>	ETAW	R	WATE	R	WATE	<u>R</u>
ANALYTE	UNITS		- 1		}		ļ				
Chloromethane	µg/L	10	ָ 'ט	10	U	10	ט	10	บ	10	U
Bromomethane	µg/L	10	U	10	บ	10	U	10	U	10	U
Visyl chloride	µg/L	10	บ	10	U	10	บ	10	บ	10	U
Chloroethane	µg/L	10	น	10	ט	10	U	10	U	10	U
Mathylene chloride	µg/L	5.0	U	5.0	U	5.0	υį	5.0	Ü	5.0	U
Acetone	µg/L	4.1	J	7.2	J	13	J	37		11	J
Carbon disulfide	µg/L	5.0	U	5.0	U	5.0	U	5.0	ט	5.0	U
1,1-Dichloroethene	µg/L	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,1-Dichloroethane	µg/L	5.0	U	5.0	U	5.0	บ	5.0	ָ יי	5.0	U
1,2-Dichloroethene (total)	µg/L	5.0	บ	5.0	U	5.0	U	5.0	U	5.0	U
cis-1,2-Dichloroethene	µg/L	NA	1	NA		NA		NA		NA	
trans-1,2-Dichloroethene	µg/L	NA		NA		NA		NA		NA	
Chloroform	µg/L	5.0	U	5.0	U	5.0	บ	5.0	U	5.0	U
1,2-Dichloroethane	mg/L	5.0	U	5.0	U	5.0	U	5.0 .	U	5.0	U
2-Butanone	mg/L	20	U	20	U	20	U	20	U	20	U
1,1,1-Trichloroethane	pg/L	5.0	U	5.0	U	5.0	U	5.0	υ 	5.0	U
Carbon tetrachloride	mg/L	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Bromodickloromethese	mg/L	5.0	U	5.0	U	5.0	U	5.0	U 	5.0	U
1.2-Dichloropropene	Mg/L	5.0	U	5.0	U	5.0	U	5.0	U	5.0 5.0	U
ch-1,3-Dichloropropene	mg/L	5.0	U	5.0	U	5.0	U	5.0	U U	5.0 5.0	U U
Trichloroethene	pg/L	5.0	U	5.0	U	5.0	U	5.0		5.0 5.0	U
Dibromochloromethane	pg/L	5.0	U	5.0	U	5.0	U	5.0 5.0	U U	5.0 5.0	บ
1,1,2-Trichioroethane	Mg/L	5.0	Ü	5.0	U U	5.0 5.0	บ บ	5.0	U	5.0 9.1	U
Benzeue	mg/L	5.0	U	5.0	IJ	5.0		5.0 5.0	ט	9.1 5.0	ט
trans-1,3-Dichloropropene	pg/L	5.0	U	5.0	_		ט		- i	5.0	U
Bromoform	mg/L	5.0	Ü	5.0	U	5.0	ָּט	5.0 3.2	U	3.U	U
4-Methyl-2-pentanone	pg/L	20	U 	20	U	20	U	3.2 20	J	20 20	บ
2-Heranone	mg/L	20	U	20	U U	20 5.0	U U	20 5.0	U U	لم 5.0	U
Tetrachloroethene	pg/L	5.0	U	5.0	บ	5.0 5.0	U	5.0	บ	5.0	U
1,1,2,2-Tetrachloroethane	µg/L	5.0	Ü	5.0	_	5.0	U	5.0	บ	5.0 5.0	
Toluene	pg/L	5.0 5.0	U U	5.0 5.0	U	5.0 5.0	ט	5.0 5.0	ט	5.0 5.0	บ
Chlorobenzene	µg/L		_		_		_		- !		
Dhylbenzene	pg/L	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Styrene	Mg/L	5.0	ນ	5.0	U	5.0	ט	5.0	U	5.0	U
Xylunes (total)	µg/L	5.0	U	5.0	U	5.0	บ บ	5.0	U	5.0	U U
Viny! acetate	mg/L	10	U	10	U	10	U	10	U	10	U

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N/A - Not applicable.

NA - Not Analyzed

- * This sample is an Equipment Rinsate Blank.
- ** This sample is a Travel Blank.

Approved for Quality
Assurance Release by:

The Rev. O

Date 4 17/46

Voe/W/Comb 9/17/9/

SAMPLE LOCATION:		GL-WS-M	N -5	GL-WS-M	W-6	GL-WS-MV	V-7	GL-WS-M	V-8	GL-WS-DECON	WATER
DATE COLLECTED: MOISTURE CONTENT: MATRIX:		7/23/90 N/A Water		7/23/9 N/A WATEI		7/23/96 N/A WATER	j	7/22/90 N/A WATER		6/24/96 N/A WATER	
ANALYTE	UNITS										
Chloromethane	μg/L	100	บ	1200	υ	5000	U	10	U	10	υ
Bromomethane	μg/L	100	บ	1200	U	5000	ប	10	U	10	ι
Vinyl chloride	μg/L	100	บ	1200	υ	5000	បៀ	10	U	10	τ
Chloroethane	μg/L	100	υ	1200	U	5000	U	10	U	10	υ
Methylene chloride	μg/L	50	บ	620	บ	2500	υ	5.0	U	5.0	ι
Acetone	μg/L	1600		24000	J (58000		7.8	J	20	ι
Carbon disulfide	μg/L	50	บ	620	υ	2500	υ	5.0	U	5.0	υ
1,1-Dichloroethene	μg/L	50	U	620	บไ	2500	υ	5.0	U	5.0	U
1,1-Dichloroethane	μg/L	50	บ	620	υ	2500	ט	5.0	U	5.0	Ü
1,2-Dichloroethene (total)	μg/L	50	U	620	บไ	2500	บ	5.0	Ū	5.0	Ü
js-1,2-Dichloroethene	μg/L	NA		NA		NA		NA		NA	
Trans-1,2-Dichloroethene	μg/L	NA		NA		NA	1	NA		NA NA	
Chloroform	μg/L	50	บ	620	υ	2500	ט	5.0	U	44	
1,2-Dichloroethane	μg/L	50	ប	620	ן ט	2500	ซ	5.0	Ü	5.0	ι
2-Butanone	μg/L	200	U	470	ı j l	1500	J	20	U	20	ι
1,1,1-Trichloroethane	μg/L	50	ប	620	Ü	2500	Ü	5.0	U	5.0	ι
Carbon tetrachloride	μg/L	50	ប	620	ן ט	2500	U	5.0	U	5.0	ί
Bromodichloromethane	μg/L	50	ប	620	บ	2500	บ	5.0	U	12	
1,2-Dichloropropane	μg/L	50	บ	620	υ	2500	U	5.0	U	5.0	U
تنه-1,3-Dichloropropene	μg/L	50	U	620	י ט	2500	บ	5.0	U	5.0	ι
ichloroethene	μg/L	50	υ	620	υ	2500	υ	5.0	U	5.0	ι
Dibromochloromethane	μg/L	50	υ	620	υ	2500	ן ט	5.0	U	5.0	υ
1,1,2-Trichloroethane	μg/L	50	U	620	υl	2500	וט	5.0	U	5.0	ι
Benzene	μg/L	110		620	ן ט	2500	បៀ	5.0	U	5.0	υ
trans-1,3-Dichloropropene	μg/L	50	υ	620	υ	2500	ן ט	5.0	ប	5.0	τ
Bromoform	μg/L	50	υ	620	υ	2500	ับไ	5.0	U	5.0	υ
4-Methyl-2-pentanone	μg/L	260		12000	f	30000	ŀ	20	U	20	Ü
2-Hexanone	μg/L	200	ซ	2500	ט	10000	ט	20	U	20	υ
Tetrachioroethene	μg/L	50	บ	620	บ	2500	U	5.0	U	5.0	U
4,1,2,2-Tetrachioroethane	μg/L	50	บ	620	יט	2500	נט	5.0	Ū	5.0	Ü
Toluene	μg/L	50	บ	620	υ	2500	U	5.0	U	5.0	υ
Chlorobenzene	μg/L	50	υ	620	บ	2500	U	5.0	U	5.0	ι
Ethylbenzene	μg/L	50	U	620	บ	2500	υ	5.0	U	5.0	ι
Styrene	μg/L	50	ט	620	υ	2500	υ	5.0	U	5.0	ι
Xylenes (total)	μg/L	50	υ	620	บ	2500	υ	5.0	U	5.0	ι
Vinyl acetate	μg/L	100	U	1200	U	5000	u	10	Ü	10	τ

- J-This result should be considered a quantitative estimate.
- B This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration.
- U This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.
- UJ This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate.

N/A - Not applicable.

NA - Not Analyzed

- * This sample is an Equipment Rinsate Blank.
- → This sample is a Travel Blank.

Voe/W/Com

SAMPLE LOCATION:		GL-WS-ER-	2 01°	GL-WS-ER-	202*	TRIP BLAN	K=	TRIP BLAN	Kee	TRIP BLAN	K
		6/27/9		7/10/90	. 1	6/27/96	1	6/27/96		6/27/96	,
DATE COLLECTED:		N/A	•	N/A	'	N/A		N/A		N/A	
MOISTURE CONTENT:		WATE	,	WATER	,	WATER	}	WATER		WATER	
MATRIX:	UNITS	WAIE	`	WAILS	-						
ANALYTE	µg/L	10	U	10	ט	NA	Ī	10	บ	10	U
Chloromethane Beogramethane	pg/L pg/L	10	บ	10	U	NA	ł	10	υ	10	U
Vigyl chloride	Mg/L	10	บ	10	์ บ	10	U	10	υ	10	Ų
- ,	1	10	Ü	10	บิ	NA		10	บ	10	U
Chlorosthane Mathylane chloride	μg/L μg/L	50	บ	5.0	C I	NA	1	5.0	บ	5.0	U
•		20	Ü	20	Ü	20	u l	13		20	U
Acetone	µg/L	بم 5.0	บ	5.0	Ü	5.0	U	5.0	U	5.0	U
Carbon disulfide	ng/L	5.0	U	5.0	U	5.0	บ	5.0	บ	5.0	U
1,1-Dichloroethene	µg/L	5.0 5.0	บ	5.0	i:	NA.	-	5.0	Ū	5.0	U
1,1-Dichloroethane	µg/L	5.0 5.0	บ	5.0	บ	NA NA	Ϊ	5.0	Ū	NA	
2-Dichloroethene (total)	µg/L	NA NA	U	NA	U	2.5	v l	NA	-	2.5	U
de-1,2-Dichloroethene	µg/L	NA NA		NA NA		2.5	บ	NA		2.5	υ
zans-1,2-Dichloroethene	µg/L	5.0	U	5.0	υ	NA	<u> </u>	5.0	บ	5.0	U
Chloroform	µg/L		u	5.0	U	NA.		5.0	Ü	5.0	U
2-Dichloroshane	mg/L	5.0	_	3.U 20	บ	20	บ	20	บ	20	Ū
2-Butanone	pg/L	20	U U	لم 5.0	บ	NA	o į	5.0	Ü	5.0	Ū
,1,1-Trichlorosthame	pg/L	5.0	U	5.0	U	NA NA	1	5.0	ັບໍ	5.0	Ü
Carbon tetrachloride	mg/L	5.0 5.0	บ	5.0 5.0	บ	NA NA		5.0	Ü	5.0	Ū
Promodichioromethene	µg/L	5.0	U	5.0	U	NA NA		5.0	Ü	5.0	U
1,2-Dichloropropune	mg/L		บ	5.0	U	NA NA		5.0	บ	5.0	Ū
ds-1,3-Dickloropropene	pg/L	5.0	_	5.0 5.0	Ü	5.0	ប	5.0	Ü	5.0	Ū
[richlorosthene	mg/L	2.1 5.0	J U	5.0	U	NA.	Ŭ	5.0	Ü	5.0	Ü
Dibromochloromethane	pg/L		U	5.0	U	NA NA		5.0	U	5.0	Ū
1,1,2-Trichloroethane	mg/L	5.0	_	5.0	บ	5.0	U	5.0	บ	5.0	U
Become	pg/L	5.0	U	5.0 5.0	บ	NA	U	5.0	บ	5.0	υ
trans-1,3-Dickloropropene	pg/L	5.0	U	5.0	U	NA NA		5.0	บ	5.0	Ü
Broansions	pg/L	5.0	_	3.U 20	U	20	U	20	U	20	ŭ
4-Mathyl-2-pentanone	mg/L	7	J		บ	NA		20	บ	20	บ
2-Hexanone	mg/L	20	U	20	U	NA NA		5.0	บ	5.0	ย
Tetrachionoshene	Mg/L	5.0	U	5.0	บ	NA NA		5.0	บ	5.0	U
1,1,2,2-Tetrachloroethane	mg/L	5.0	U	5.0	_	NA 5.0	บ	5.0	ט	5.0	ť
Talume	Mg/L	5.0	U	5.0	Ü		U	5.0 5.0	บ	5.0 5.0	ı
Chlorobenzene	pg/L	5.0	U	5.0	Ü	NA E O	** 1	5.0	U	5.0 5.0	ī
Ethytheneum	pg/L	5.0	U	5.0	U	5.0	U		บ	5.0	ι
Styrene	mg/L	5.0	U	5.0	U	5.0	U	5.0	_	5.0 5.0	Į
Xylanas (total)	mg/L	5.0	U	5.0	Ü	5.0	U	5.0	U U	5.0 10	Ĺ
Visyl acetate	pg/L	10	U	10	U	NA		10	υ	10	U

- J This result should be considered a quantitative estimate.
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- U This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.
- U] This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate.

N/A - Not applicable.

NA - Not Analyzed

- * This sample is an Equipment Rinsate Blank.
- ** This sample is a Travel Blank.

Approved for Quality
Assurance Referently:

Mer. 0

Date 1/17/14

Voe/N/Comi

SAMPLE LOCATION:	T	TRIP BLA	VK**	TRIP BLAN	IK**	GL-WS-T	B ™	GL-WS-T	B**	GL-WS-T	B**
	}	25C	ł		}		}	N/A	ļ	N/A	
DATE COLLECTED:	ł	6/27/9	6	7/2/96	. }	7/10/9	5	7/11/9	6	7/24/9	6
MOISTURE CONTENT:		N/A	l	N/A]	N/A	l	N/A	ļ	, N/A	
MATRIX:	}	WATE	R J	WATER	.	WATE	2	WATE	R	WATE	R _
ANALYTE	UNITS										
Chloromethane	μg/L	10	ט	NA	1	10	U	NA		10	ι
Bromomethane	μg/L	10	ן ט	NA	ł	10	U	NA	- 1	10	Į
Vinyl chloride	μg/L	10	U	10	υ	10	บ	10	บ	10	ι
Chloroethane	μg/L	10	บ	NA		10	บ	NA	- 1	10	ŧ
Methylene chloride	µg/L	5.0	υ	NA	ł	5.0	ט	NA	ł	5.0	Į
Acetone	μg/L	20	U	20	υ	20	U	20	ן ט	20	ι
Carbon disulfide	μg/L	5.0	บ	5.0	υ	5.0	บ	5.0	บ	5.0	ι
1,1-Dichloroethene	μg/L	5.0	บ	5.0	ַ	5.0	บ	5.0	บ	5.0	ι
1,1-Dichloroethane	μg/L	5.0	บ	NA	1	5.0	บ	NA]	5.0	ι
1,2-Dichloroethene (total)	μg/L	NA	j	NA	1	NA	1	NA	1	5.0	ι
cis-1,2-Dichloroethene	μg/L	2.5	υ }	2.5	υ	2.5	υl	2.5	υ	NA	
trans-1,2-Dichloroethene	μg/L	2.5	. บ	2.5	บ	2.5	บ [2.5	υĺ	NA	
Chloroform	μg/L	5.0	บ	NA	1	5.0	บ	NA		5.0	ŧ
1,2-Dichloroethane	μg/L	5.0	U	NA	ł	5.0	U	NA	ł	5.0	Ę
2-Butanone	μg/L	20	υ	20	บ	20	υ	20	υ	20	ι
1,1,1-Trichloroethane	μg/L	5.0	U	NA	ļ	5.0	บ	NA	1	5.0	τ
Carbon tetrachloride	μg/L	5.0	υ	NA	1	5.0	บไ	NA	į	5.0	Į
Bromodichloromethane	μg/L	5.0	บ	NA	1	5.0	บ	NA	ľ	5.0	τ
1,2-Dichloropropane	µg/L	5.0	บ	NA	- [5.0	U	NA	1	5.0	(
is-1,3-Dichloropropene	μg/L	5.0	ט	NA	1	5.0	บ	NA	I	5.0	ŧ
Trichloroethene	μg/L	5.0	υl	5.0	υ	5.0	บ	5.0	υl	5.0	ί
Dibromochloromethane	μg/L	5.0	บ	NA		5.0	บ	NA	1	5.0	Ţ
1,1,2-Trichloroethane	μg/L	5.0	υ	NA)	5.0	ט	NA	- 1	5.0	Į
Benzene	μg/L	5.0	บ	5.0	บ [5.0	บ [5.0	บไ	5.0	Ţ
trans-1,3-Dichloropropene	μg/L	5.0	U	NA		5.0	υ	NA	Į.	5.0	Ţ
Bromoform	µg/L	5.0	υl	NA	- 1	5.0	ט	NA	ŀ	5.0	ŧ
4-Methyl-2-pentanone	μg/L	20	U	20	υl	20	บ	20	ט	20	t
2-Hexanone	μg/L	20	υl	NA	- 1	20	ט	NA	- }	20	Į
Tetrachloroethene	μg/L	5.0	บ	NA	1	5.0	ע	NA)	5.0	t
1,1,2,2-Tetrachloroethane	μg/L	5.0	υ	NA	1	5.0	ט	NA	i	5.0	t
l'oluene	μg/L	5.0	บ (5.0	บไ	5.0	บไ	5.0	U	5.0	l
Chlorobenzene	μg/L	5.0	บ	NA	}	5.0	ט	NA	į	5.0	1
Ethylbenzene	μg/L	5.0	U	5.0	U	5.0	U	5.0	บ	5.0	Į
Styrene	µg/L	5.0	υ	5.0	U	5.0	υ	5.0	U	5.0	į
(vlenes (total)	μg/L	5.0	Ū	5.0	υ	5.0	υl	5.0	U	5.0	1
Vinvl acetate	µg/L	10	บไ	NA	-	10	u	NA.	_	10	1

- J This result should be considered a quantitative estimate.
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N/A - Not applicable.

NA - Not Analyzed

- * This sample is an Equipment Rinsate Blank.
- ** This sample is a Travel Blank.

Approved for Quality
Assurance Release by:

Date 9/17/96

Voe/W/Comb

SAMPLE LOCATION:		GL-WS-MW	/-1	GL-WS-MW-1	DUPE	GL-WS-MV	V-2	GL-WS-M	W-3
DATE COLLECTED:	ŀ	7/24/96		7/24/96		7/23/96	. 1	7/24/96	5
MOISTURE CONTENT:	i	N/A		N/A	1	N/A		N/A	
MATRIX:	l	WATER		WATER	1	WATER		WATER	Ł
ANALYTE	UNITS								
Phenol	μg/L	10	υ	10	ט	10	υ	10	บ
bis(2-Chloroethyl) ether	μg/L	10	U	10	υ	10	υ	10	บ
2-Chlorophenol	μg/L	10	υ	10	ט	10	ַ ט	10	υ
2-Methylphenol	μg/L	10	υ	10	บ	10	บ	10	ן ט
4-Methylphenol	μg/L	10	บ	10	υ	10	ַ	10	υ
N-Nitrosodi-n-propylamine	μg/L	10	U	10	U	10	ט	10	ן ט
Hexachloroethane	μg/L	10	U	10	บ	10	บ	10	U
Nitrobenzene	μg/L	10	U	10	บ	10	บ	10	ָ ט
isophorone	μg/L	10	υ	10	บ	10	บ	10	บ
2-Nitrophenol	μg/L	10	บ	10	บ	10	υ	10	U
bis(2-Chloroethoxy)methane	μg/L	10	U	10	บ	10	บ	10	บ
Naphthalene	μg/L	10	U	10	υ	10	บ	10	υ
4-Chlorosniline	µg/L	10	υ	10	บ	10	บ	10	U
· lexachlorobutadiene	μg/L	10	บ	10	บ	10	บ	10	υ
4-Chloro-3-methylphenol	μg/L	10	บ	10	บ	10	ប	10	U
2-Methylnaphthalene	µg/L	10	บ	10	U	10	U	10	U
Hexachlorocyclopentadiene	μg/L	50	U	50	υ	50	บ	50	U
2-Chloronaphthalene	ug/L	10	U	10	บ	10	บ	10	บ
2-Nitroeniline	μ g/ L	50	U	50	บ	50	บ	50	ָ ט
Dimethyl phthalate	μg/L	10	U	10	บ	10	ע	10	U
Acenaphthylene	μ g/ L	10	U	10	บ	10	ט	10	U
3-Nitroenikine	μ g/L	50	U	50	ָ ט	50	บ	50	บ
Acenaphthene	μ g/ L	10	U	10	บ	10	ט	10	Ü
4-Nitrophenol	μg/Ľ	50	บ	50	U	50	U	50	U
Dibenzofuran	μg/L	10	บ	10	บ	10	U	10	บ
Diethyl phthalate	μ g/L	10	U	10	υ	10	U	10	U
4-Chiorophenyl phenyl ether	μg/L	10	U	10	U	10	U	10	U
Pluorene	μg/L	10	U	10	U.	10	บ	10	U
4-Nitroeniline	μg/L	50	U	50	บ	50	U	50	U
N-Nitrosodiphenylamine	μg/L	10	U	10	υ	10	บ	10	U
4-Bromophenyl phenyl ether	μg/L	10	U	10	U	10	บ	10	U
Hexachlorobenzene	μg/L	10	U	10	บ	10	U	10	U
Pentachlorophenol	μg/L	50	U	50	ប	50	บ	50	U
Phenanthrene	μg/L	10	U	10	บ	10	U	10	U
Anthracene	μg/L	10	U	10	U	10	U	10	บ

Approved for Quality
Assertation Reference by:

Stage Of Box.

Date 9/1/1/K

Svoas/W/Corrib. 9/17/96

SAMPLE LOCATION:	T	GL-WS-MW	/-1	GL-WS-MW-1	DUPE	GL-WS-M	V-2	GL-WS-M	W-3
DATE COLLECTED:	ĺ	7/24/96		7/24/96	5 [7/23/96	•	7/24/9	5
MOISTURE CONTENT:		N/A		N/A	i	N/A	Į.	N/A	
MATRIX:	l	WATER		WATER	<u> </u>	WATER		WATER	₹
ANALYTE	UNITS								
Carbazole	μg/L	10	υ	10	ប	10	ן ט	10	υ
Di-n-buty! phthalate	μg/L	10	ับ	10	U	10	ប [10	บ
Fluoranthene	μg/L	10	บ	10	บ	10	ן ט	10	U
Pyrene	μg/L	10	υ	10	υ	10	υ	10	U
Butyl benzyl phthalate	μg/L	10	บ	10	U	10	บ	10	U
Benzo(a)anthracene	μg/Ľ	10	บ	10	U	10	υ	10	υ
Chrysene	μg/L	10	บ	10	U	10	U	10	บ
bis(2-Ethylhexyl) phthalate	μg/L	10	บ	2.3	J	2.2	J	7.4	J
Di-n-octyl phthalate	μg/L	10	บ	10	U	10	υ	10	U
Benzo(b)fluoranthene	μg/L	10	บ	10	U	10	υ	10	บ
Benzo(k)fluoranthene	μg/L	10	บ	10	ַ ט	10	ן ט	10	U
Benzo(a)pyrene	μg/L	10	บ	10	υ	10	ַ ע	10	U
Indeno(1,2,3-cd)pyrene	μg/L	10	U	10	ַ ט	10	ן ט	10	U
Dibenz(a,h)anthracene	μg/L	10	บ	10	ן ט	10	υ	10	υ
Benzo(ghi)perylene	μg/L	10	บ	10	ַ ט	10	ט	10	U
1,3-Dichlorobenzene	μg/L	10	ប	10	ע	10	ן ט	10	U
,4-Dichlorobenzene	μg/L	10	บ	10	บ (10	U	10	U
71,2-Dichlorobenzene	μg/L	10	บ	10	U	10	ן ט	10	U
2,2'-Oxybis(1-Chloropropane)	μg/L	10	บ	10	ע	10	ַ ט	10	U
2,4-Dimethylphenol	μg/L	10	บ	10	U	10	U	10	U
2,4-Dichlorophenol	μg/L	10	บ	.10	ן ט	10	บ	10	U
1,2,4-Trichlorobenzene	μg/L	10	บ	10	ַ ע	10	ט	10	U
2,4,6-Trichlorophenol	μg/L	10	บ	10	υ	10	ט	10	υ
2,4,5-Trichlorophenol	μg/L	10	บ	10	ע	10	ט	10	U
¹ 2,6-Dinitrotoluene	μg/L	10	บ	10	ן ט	10	บ	10	U
2,4-Dinitrophenol	μg/L	50	บ	50	บ	50	ט	50	U
2,4-Dinitrotoluene	μg/L	10	บ	10	ט	10	υ	10	บ
4,6-Dinitro-2-methylphenol	μg/L	50	υ	50	ַ ט	50	บ	50	U
3,3'-Dichlorobenzidine	μg/L	50	υ	50	υ	50	ט	50	U

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- U This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.
- UJ This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate.
- N/A Not applicable.
- NA Not Analyzed.
 - * This sample is an Equipment Rinsate Blank.

Approved for Quality
Assurance Release by:

Pare 9/17/86

Svoas/W/Comb. 9/17/96

SAMPLE LOCATION:		GL-WS-M	W-4	GL-WS-M	W-5	CL-WS-MV	V-6	GL-WS-MV	V-7
DATE COLLECTED:		7/22/9	s	7/23/9	6	7/23/96		7/23/96	
MOISTURE CONTENT:	-	N/A		N/A		N/A	1	N/A	
MATRIX:	j	WATE	≀	WATE	R	WATER		WATER	
ANALYTE	UNITS								
Phenol	μg/L	10	ע ∤	180]]	36000		9300	
bis(2-Chloroethyl) ether	µg/L	10	υ	200	υ	8000	U	2000	U
2-Chlorophenol	μg/L	10	υ	200	บ	8000	υ	2000	U
2-Methylphenol	μg/L	10	บ	200	บ	8000	U	2000	U
4-Methylphenol	μg/L	10	ט	200	U	8000	U	2000	U
N-Nitrosodi-n-propylamine	μg/L	10	บ	200	U	8000	ប	2000	U
Hexachloroethane	μg/L	10	บ	200	U	8000	U	2000	U
Nitrobenzene	μg/L	10	ָׁ ט	200	υ	8000	บ	2000	υ
Isophorone	μg/L	10	U	200	U	8000	บ	2000	U
2-Nitrophenol	μg/L	10	U	200	U	8000	U	2000	ប
bisQ-Chloroethoxy)methane	μg/Ľ	10	υ	200	บ	8000	U	2000	U
Naphthalene	μg/L	10	U	200	υ	8000	U	2000	U
4-Chloroeniline	μg/L	10	U	200	U	8000	บ	2000	U
exachlorobutadiene	μg/L	10	ָ ע	200	บ	8000	U	2000	บ
-Chloro-3-methylphenol	μ g /L	10	U	200	บ	8000	U	2000	U
2-Methylraphthalene	μ g /L	10	U	200	บ	8000	U	2000	U
Hexachlorocyclopentadiene	μg/L	50	บ	1000	บ	40000	U	10000	U
2-Chloronaphthalene	μ g /L	10	บ	200	บ	8000	U	2000	U
2-Nitroeniline	μ g /L	50	บ	1000	U	40000	ប	10000	U
Dimethyl phthalate	μg/L	10	บ	200	υ	8000	บ	2000	U
Acenaphthylene	μ g /L	10	U	200	U	8000	U	2000	U
3-Nitroeniline	μg/L	50	U	1000	บ	40000	บ	10000	U
Acenaphthene	μg/L	10	U	200	U	8000	U	2000	บ
4-Nitrophenol	μ g /L	50	U	1000	U	40000	U	10000	U
Dibenzofuran	μg/L	10	U	200	U	8000	U	2000	U
Diethyl phthalate	μg/L	10	U	200	U	8000	บ	2000	U
4-Chlorophenyl phenyl ether	μ g/ L	10	U	200	บ	8000	U	2000	υ
Fluorene	μ g /L	10	U	200	ַ	8000	U	2000	U
1-Nitroaniline	µg/L	50	U	1000	บ	40000	U	10000	U
N-Nitrosodiphenylamine	μg/L	10	U	200	บ	8000	U	2000	U
t-Bromophenyl phenyl ether	μg/L	10	U	200	บ	8000	U	2000	บ
Hexachlorobenzene	μg/L	10	υ	200	U	8000	U	2000	U
Pentachlorophenol	μg/L	50	U	1000	บ	40000	U	10000	U
Phenanthrene	μg/L	10	U	200	บ	8000	บ	2000	U
Anthracene	μg/L	10	U	200	บ	8000	U	2000	U

Approved for Quality

American Reference by:

Org Corp Ber.

Option 9/17/96

Svoss/W/Comb. 9/17/96

SAMPLE LOCATION:		GL-WS-M	W-4	GL-WS-M	W-5	GL-WS-M	N-6	GL-WS-MV	N-7
DATE COLLECTED:		7/22/9	6	7/23/9	6]	7/23/9	;	7/23/96	5
MOISTURE CONTENT:		N/A	ł	N/A		N/A		N/A	
MATRIX:	ŀ	WATE	₹	WATE	R }	WATE	1	WATER	:
ANALYTE	UNITS								
Carbazole	μg/L	10	ַ	200	ע	8000	U	2000	U
Di-n-butyl phthalate	μg/L	10	ן ט	200	บ	8000	ט	2000	U
Fluoranthene	μg/L	10	Ì	200	บ	8000	ן ט	2000	U
Pyrene	μg/L	10	ן ט	200	ט	8000	ט	2000	U
Butyl benzyl phthalate	μg/L	10	ע	200	υ (8000	บ	2000	U
Benzo(a)anthracene	μg/L	10	υ	200	ט	8000	ע	2000	U
Chrysene	μg/L	10	บ (200	บ (8000	υ	2000	U
bis(2-Ethylhexyl) phthalate	μg/L	10	ַ ט	200	Մ 🕽	8000	υj	2000	Ū
i-n-octyl phthalate	μg/L	10	ט	200	ט	8000	ן ט	2000	• ប
Benzo(b)fluoranthene	μg/L	10	υ	200	ַ ט	8000	υ	2000	ប
Benzo(k)fluoranthene	μg/L	10	υ	200	ן ט	8000	ן ט	2000	U
Benzo(a)pyrene	μg/L	10	U	200	ט	8000	ן ט	2000	U
Indeno(1,2,3-cd)pyrene	μg/L	. 10	ן ט	200	บ	8000	ט	2000	υ
Dibenz(a,h)anthracene	μg/L	10	U	200	ן ט	8000	ע	2000	บ
Benzo(ghi)perylene	μg/L	10	บไ	200	ַ ט	8000	υ	2000	U
1,3-Dichlorobenzene	μg/L	10	บ	200	บ	8000	ប	2000	บ
4-Dichlorobenzene	μg/L	10	ט	200	υ	8000	ט	2000	υ
2-Dichlorobenzene	μg/L	10	ט	200	ט	8000	ע	2000	U
2,2'-Oxybis(1-Chloropropane)	μg/L	10	บ	200	υ	8000	ט	2000	บ
2,4-Dimethylphenol	μg/L	10	บ [200	ן ט	8000	υ	2000	บ
2,4-Dichlorophenol	μg/L	10	ן ט	200	υ	8000	บ	2000	บ
1,2,4-Trichlorobenzene	μg/L	10	υ	200	ט	8000	υ	2000	U
2,4,6-Trichlorophenol	μg/L	10	ע	200	ן ט	8000	υ	2000	ับ
2,4,5-Trichlorophenol	μg/L	10	ן ט	200	ט	8000	υ	2000	U
6-Dinitrotoluene	μg/L	10	ן ט	200	ן ט	8000	ן ט	2000	บ
4-Dinitrophenol	μg/L	50	ט	1000	υ	40000	ט	10000	Ü
2,4-Dinitrotoluene	μg/L	10	ט	200	ט	8000	ט	2000	U
4,6-Dinitro-2-methylphenol	μg/L	50	ַ ט	1000	υ	40000	υ	10000	U
3,3'-Dichlorobenzidine	μg/L	50	บไ	1000	ן ט	40000	υ	10000	บ

- J This result should be considered a quantitative estimate.
- B This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration.
- U This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.
- UJ This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate.
- N/A Not applicable.
- NA Not Analyzed.
 - * This sample is an Equipment Rinsate Blank.

Approved for Quality
Assurance Release by:

Rev.

Date 9/17/96

Svom/W/Comb

SAMPLE LOCATION:		GL-WS-M	N-8	GL-WS-DECON	WATER	GL-WS-ER	-201*	GL-WS-ER	-202*
DATE COLLECTED:	i	7/22/9		6/24/9		6/27/9	6	7/10/9	6
MOISTURE CONTENT:		N/A		N/A	ľ	N/A	į	N/A	
MATRIX:	ļ	WATE	t	WATE	R I	WATE	R	WATE	R
ANALYTE	UNITS								
Phenol	µg/L	10	ប្យ	10	U J	2]	10	U
bis(2-Chloroethyl) ether	μg/L	10	บ	10	U	10	υ	10	U
2-Chlorophenol	μg/L	10	ហ្វ	10	ប្ប	10	บ	10	U
2-Methylphenol	μg/L	10	U	10	ប្យ	10	บ	10	υ
4-Methylphenol	μg/L	10	ี่	10	ប្យ	10	U	10	U
N-Nitrosodi-n-propylamine	μg/L	10	Ú	10	บ	10	บ	10	ų
Hexachloroethane	μg/L	10	U	10	บ	10	U	10	บ
Nitrobenzene	μg/L	10	บ	10	บ	10	ט	10	U
Isophorone	µg/L	10	U	10	U	10	บ	10	U
2-Nitrophenol	µg/L	10	υj	10	ບ _ັ ງ	10	U	10	υ
bis(2-Chloroethoxy)methane	µg/L	10	U	10	U	10	บ	10	U
Naphthalene	μg/L	10	U	10	U	10	U	10	υ
4-Chlorosniline	μg/L	10	U	10	U	10	U	10	U
exachlorobutadiene	µg/L	10	U	10	U	10	บ	10	บ
FI-Chloro-3-methylphenol	µg/L	10	ហ្វ	10	ប្យ	10	บ	10	U
2-Methylnaphthalene	μg/L	10	U	10	U	10	U	10	U
Hexachlorocyclopentadiene	μg/L	50	U	50	υ	50	บ	50	U
2-Chloronaphthalene	μg/L	10	บ	10	U	10	U	10	U
2-Nitroaniline	μg/L	50	U	50	U	50	U	50	U
Dimethyl phthalate	μg/L	10	U	10	U	10	U	10	U
Acenaphthylene	μg/L	10	υ	10	U	10	บ	10	U
3-Nitroeniline	µg/L	50	U	50	U	50	U	50	υ
Acenaphthene	μg/L	10	U	10	บ	10	U	10	Ü
4-Nitrophenol	μg/L	50	IJ	50	ប្យ	50	U	50	U
Dibenzofuran	µg/L	10	U	10	U	10	U	10	บ
Diethyl phthalate	μg/L	10	U	10	บ	10	U	10	U
4-Chlorophenyl phenyl ether	μg/L	10	U	10	U	10	บ	16	U
Pluorene	μg/L	10	U	10	U	10	บ	10	U
4-Nitroaniline	μg/L	50	υ	50	บ	50	บ	50	U
N-Nitrosodiphenylamine	µg/L	10	U	10	U	10	U	10	U
4-Bromophenyl phenyl ether	µg/L	10	U	10	U :	10	บ	10	υ
Hexachlorobenzene	μg/L	10	U	10	U	10	U	10	U
Pentachlorophenol	μg/L	. 50	UJ	50	ហ្វ÷	50	U	50	U
Phenanthrene	μg/L	10	U	10	U	10	บ	10	U
Anthracene	μg/L	10	บ	10	U	10	U	10	บ

Approved for Quality
Assurance Referee by:

July Per.

Date 9/17/26

9/17/98

- 1	7/22/9			WATER				-202*
	114419	6	6/24/96	1	6/27/9	6	7/10/9	6
- 1	N/A		N/A		N/A	1	N/A	
	WATE	R	WATER		WATE	R_	WATE	R
UNITS								
μg/L	10	บ	10	บ	10	U	10	U
μg/L	10	U	10	ַ ט	7.7	J	10	U
μg/L	10	Ū	10	U	10	υ¦	10	U
μg/L	10	บ	10	υ	10	υļ	10	U
μg/L	10	บ	10	υ	10	บ	10	U
μg/L	10	U	10	U	10	บ	10	U
μg/L	10	U	10	ן ט	10	∪ ו	10	U
μg/L	10	U	10	บ	10	บ [10	U
μg/L	10	บ	10	บ	10	ַ ט	10	U
μg/L	10	U	10	ַ ט	10	ן ט	10	U
μg/L	10	Ū	10	ט	10	υ ∫	10	υ
µg/L	10	U	10	บ	10	ט	10	U
μg/L	10	Ū	10	U	10	ט	10	U
μg/L	10	υ	10	ָט ן	10	บ	10	U
μg/L	10	U	10	υ	10	บ	10	U
μg/L	10	U	10	ע	10	ן ט	10	U
μg/L	10	U	10	U	10	ן ט	10	บ
μg/L	10	U	10	υ	10	ט	10	U
μg/L	10	บ	10	ן ט	10	ט	10	บ
μg/L	10	IJ	10	ប្យ	10	υ	10	U
μg/L	. 10	ប្យ	10	υj	10	ט	10	υ
µg/L	10	U	10	บ	10	ט	10	ប
	10	UJ	10	ប្ប	10	ן ט	10	U
	10	ប្យ	10	ប្យ	10	υ	10	U
	10	บ	10	บ	10	ע	10	บ
	50	UJ	50	ប្យ	50	ן ט	50	บ
μg/L	10	บ	10	υ	10	บ	10	Ū
μg/L	50	ប្យ	50	ប្យ	50	บ	50	U
μg/L	50	บ	50	บ	50	บ	50	U
	ルタ/L ルタ/L ルタ/L ルタ/L ルタ/L ルタ/L ルタ/L ルタ/L	UNITS µg/L µg/L µg/L µg/L 10 µg/L µg/L 10	中塚/L 10 U U 中塚/L 10 U U 中塚/L 10 U 中塚/L 10 U 中塚/L 10 U 日本 10 U U 日本 10 U U 日本 10 U U 日本 10 U U U U U U U U U	UNITS µg/L µg/L µg/L 10 U 10 µg/L µg/L 10 U 10 µg/L µg/L 10	UNITS µg/L µg/L µg/L 10 U 10 U µg/L 10 U µg/L 10 U 10 U µg/L 10 U µg/L 10 U 10 U µg/L 10 U µ	UNITS	UNITS	UNITS

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- NA Not Analyzed.
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Approved for Quality Assurance Release by:	д
Men	Date 9/17/26

Svoas/W/Comb

Target Compound List Pesticides/PCB's Water Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-WS-MW	V-1	GL-WS-MW-1	DUPE	GL-WS-M	N-2	GL-WS-MW-3		
DATE COLLECTED:	j	7/24/96		7/24/96	,	7/23/%	5	7/24/96		
MOISTURE CONTENT:		N/A		N/A	}	N/A	i	N/A		
MATRIX:		WATER		WATER	:]	WATER		WATER		
ANALYTE	UNITS									
alpha-BHC	µg/L	0.050	U	0.050	ហ្យ	0.050	ប្យ	0.050	ហ្វ	
beta-BHC	μg/L	0.050	บ	0.050	ប្យ	0.050	ບງ	0.050	ប្យ	
delta-BHC	μg/L	0.050	Ľ	0.050	ប្យ	0.050	ប្រ	0.050	UJ	
gamma-BHC (Lindane)	μg/L	0.050	ប	0.050	ן נט	0.050	UJ	0.050	UJ	
Heptachlor	μg/L	0.050	ប	0.050	ប្រ∤	0.050	UJ	0.050	UJ	
Aldrin	μg/L	0.050	U	0.050	ប្រ	0.050	UJ	0.050	ប្យ	
Heptachlor epoxide	μg/L	0.050	ប	0.050	ប្យ	0.050	ប្រ	0.050	IJ	
Endosulfan I	μg/L	0.050	U	0.050	ຫຼ	0.050	ប្រ	0.050	IJ	
Dieldrin	μ g/ L	0.050	U	0.050	ບງ	0.050	UJ	0.050	บุ	
Endrin	μg/L	0.050	U	0.050	ប្យ	0.050	ប្យ	0.050	υĵ	
Endosulfan II	μ g /L	0.050	U	0.050	ប្រ	0.050	UJ	0.050	IJ	
Endosulfan sulfate	μg/L	0.050	ប	0.050	ບງ 🗆	0.050	ប្យ	0.050	υj	
Methoxychlor	μg/L	0.25	บ	0.25	ប្យ	0.25	ប្ប	0.25	ប្យ	
Endrin ketone	μ g/ L	0.050	U	0.050	ບງ	0.050	UJ	0.050	ប្យ	
Endrin aldehyde	μg/L	0.050	U	0.050	ប្ប	0.050	ហ្វ	0.050	UJ	
pha-Chlordane	μg/L	0.050	U	0.050	υj	0.050	UJ	0.050	IJ	
gamma-Chlordane	μg/L	0.050	U	0.050	UJ	0.050	UJ	0.050	IJ	
4.4'-DDE	μ g/ L	0.050	U	0.050	ហ្វ	0.050	UJ	0.050	UJ	
4,4'-DDD	μg/L	0.050	ប	0.050	UJ	0.050	UJ	0.050	IJ	
4,4°-DDT	μg/L	0.050	U	0.050	UJ	0.050	UJ	0.050	IJ	
Toxaphene	μg/L	2.0	U	2.0	UJ	2.0	UJ	2.0	IJ	
Aroclor 1016	μg/L	1.0	U	1.0	UJ	1.0	ប្យ	1.0	IJ	
Aroclor 1221	μg/L	1.0	U	1.0	ហ្វ	1.0	ប្យ	1.0	UJ	
Aroclor 1232	µg/L	1.0	U	1.0	UJ	1.0	ប្ស	1.0	IJ	
Aroclor 1242	μg/L	1.0	U	1.0	UJ	1.0	ប្ប	1.0	L.	
Aroclor 1248	μg/L	1.0	ប	1.0	UJ	1.0	UJ	1.0	υj	
Aroclor 1254	μg/L	1.0	U	1.0	UJ 📗	1.0	ប្យ	1.0	ប្យ	
Aroclor 1260	μg/L	1.0	U	1.0	υj	1.0	ប្យ	1.0	ប្យ	

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- NA Not Analyzed.
 - * This sample is an Equipment Rinsate Blank.

Approved for Quality
Assurance Release by:

O

Date

Date

Past/W/Comb. 9/17/96

Target Compound List Pesticides/PCB's Water Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-WS-MW-4		GL-WS-M	W-5	GL-WS-M	N-6	GL-WS-MW-7		
DATE COLLECTED:	ŀ	7/22/96	,	7/23/9	5	7/23/96	5	7/23/9	5	
MOISTURE CONTENT:	1	N/A	-	N/A		N/A	- [N/A		
MATRIX:	l	WATER		WATER	≀	WATER	t	WATER	₹	
ANALYTE	UNITS									
alpha-BHC	μg/L	0.050	ຫຼ	2.5	ប្យ	12	ប្យ	1.2	UJ	
beta-BHC	μg/L	0.050	ប្រ	2.5	UJ	12	UJ	1.2	ບງ	
delta-BHC	μg/L	0.050	ប្យ	2.5	UJ	12	ប្យ	1.2	ប្យ	
gamma-BHC (Lindane)	μg/L	0.050	UJ	2.5	ប្ស	12	ប្យ	1.2	ບງ	
Heptachlor	μg/L	0.050	UJ	2.5	UJ	12	UJ	1.2	ប្យ	
Aldrin	μg/L	0.050	ប្រ	2.5	ហូ∤	12	UJ	1.2	UJ	
Heptachlor epoxide	μg/L	0.050	ប្យ	2.5	ប្យ	12	UJ	1.2	ហ្វ	
ndosulfan I	μg/Ľ	0.050	맹	2.5	ហ្ស	12	ប្យ	1.2	UJ	
Dieldrin	μg/L	0.050	ប្យ	5.0	ប្យ	25	ប្យ	2.5	ប្យ	
Endrin	μg/L	0.050	ប្យ	5.0	ប្យ	25	UJ	2.5	ບ <u>ງ</u>	
Endosulfan II	μg/L	0.050	UJ	5.0	ប្យ	25	បា∤	2.5	ប្យ	
Endosulfan sulfate	μg/L	0.050	ប្យ	5.0	ប្យ	25	UJ	2.5	ប្យ	
Methoxychlor	μg/L	0.25	ប្យ	25	ប្យ	120	UJ	12	UJ	
Endrin ketone	μg/L	0.050	ប្ស	5.0	ប្ស	25	ប្យ	2.5	ប្យ	
Endrin aldehyde	μg/L	0.050	ប្យ	5.0	ប្យ	25	ប្យ	2.5	ប្យ	
>ha-Chlordane	μg/L	0.050	UJ	2.5	ប្យ	12	ប្យ	1.2	ប្យ	
15amma-Chlordane	μg/L	0.050	ប្យ	2.5	ប្យ	12	ប្យ	1.2	ប្យ	
4,4'-DDE	μg/L	0.050	ប្យ	5.0	UJ	25	ប្យ	2.5	UJ	
4,4'-DDD	μg/L	0.050	ហ្វ	5.0	ប្រ	25	υj	2.5	UJ	
4,4'-DDT	μg/L	0.050	ប្យ	5.0	ប្យ	25	UJ	2.5	IJ	
Toxaphene	μg/L	2.0	ប្យ	120	υj	620	UJ	62	ប្យ	
Aroclor 1016	μg/L	1.0	UJ	25	UJ	120	ប្យ	12	IJ	
Aroclor 1221	μg/L	1.0	ហ្វ	25	ប្រ	120	ប្យ	12	UJ	
roclor 1232	µg/L	1.0	ប្យ	25	ຫຸ	120	ຫຸ]	12	UJ	
Aroclor 1242	μg/L	1.0	υj	25	UJ	120	ຫຼ	12	UJ .	
Aroclor 1248	μg/L	1.0	ហ្វ	25	ប្យ	120	ប្រ	12	ប្យ	
Aroclor 1254	μg/L	1.0	ប្យ	50	ប្យ	250	ប្ប	25	ប្យ	
Aroclor 1260	μg/L	1.0	ប្យ	50	ប្យ 🛭	250	ប្យ	25	ប្យ	

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Approved for Quality
Assurance Release by:

Rev.

Date 9/19/96

Pest/W/Comb. 9/17/96

Target Compound List Pesticides/PCB's Water Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:	T	GL-WS-M	N-8	GL-WS-DECON V	WATER	CL-WS-ER-	201*	GL-WS-ER-	202*
DATE COLLECTED:	1	7/22/90	j	6/24/96	- 1	6/27/96	,	7/10/96	•
MOISTURE CONTENT:	1	N/A		N/A		N/A	1	N/A WATER	
MATRIX:		WATER	<u> </u>	WATER		WATER	L		
ANALYTE	UNITS								
alpha-BHC	µg/L	0.050	ប្យ	0.050	ប	0.050	U	0.050	U
beta-BHC	µg/L	0.050	ហ្វ	0.050	υ ∤	0.050	บ	0.050	U
delta-BHC	μg/L	0.050	ហ្វ	0.050	U	0.050	U	0.050	U
gamma-BHC (Lindane)	μg/L	0.050	UJ	0.050	บ	0.050	บ	0.050	U
Heptachlor	μg/L	0.050	ហ្វ	0.050	U	0.050	U	0.050	U
Aldrin	μg/L	0.050	UJ	0.050	ប	0.050	U	0.050	U
Heptachlor epoxide	μg/L	0.050	IJ	0.050	บ	0.050	U	0.050	U
Endosulfan I	μg/L	0.050	IJ	0.050	บ	0.050	U	0.050	U
Dieldrin	μg/L	0.050	ប្យ	0.050	ט	0.050	U	0.050	_ \
Endrin	μg/L	0.050	IJ	0.050	U	0.050	บ	0.050	บ
Endosulfan II	μg/L	0.050	IJ	0.050	บ	0.050	U	0.050	U
Endosulfan sulfate	μg/L	0.050	UJ	0.050	บ	0.050	U	0.050	U
Methoxychlor	μg/L	0.25	IJ	0.25	บ	0.25	บ	0.25	ប
Endrin ketone	μg/L	0.050	UJ	0.050	ן ט	0.050	U	0.050	Ŭ
Endrin aldehyde	μg/L	0.050	ប្យ		U	0.050	U	0.050	U
.lpha-Chlordane	μg/L	0.050	IJ	0.050	ប	0.050	U	0.050	U
gamma-Chlordane	μg/L	0.050	UJ	0.050	U	0.050	ប	0.050	U
4,4"-DDE	μg/L	0.050	UJ	0.050	U	0.050	บ	0.050	υ
4,1°-DDD	μg/Ľ	0.050	IJ	0.050	υ	0.050	บ∣	0.050	U
4,4'-DDT	µg/L	0.050	ហ្វ	0. 050	บ∤	0.050	บ	0.050	U
Toxaphene	μg/L	2.0	ប្យ	2.0	υ	20	บ	2.0	U
Aroclar 1016	μg/L	1.0	IJ	1.0	υ	1.0	ប	1.0	U
Aroclor 1221	μg/L	1.0	IJ	1.0	υ∤	1.0	บ	1.0	U
Aroclar 1232	μg/L	1.0	UJ	1.0	υ	1.0	ប	1.0	11
Aroclar 1242	μg/L	1.0	ບ <u>ງ</u>	1.0	ט	1.0	ប	1.0	
Aroclar 1248	μg/L	1.0	υJ	1.0	υ	1.0	ប	1.0	บ
Aroclor 1254	μg/L	1.0	ບງ	1.0	บ	1.0	บ∣	1.0	U
Aroclar 1260	μg/L	1.0	UJ	1.0	บ	1.0	บ	1.0	U

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- N/A Not applicable.
- NA Not Analyzed.
 - * This sample is an Equipment Rinsate Blank.

Approved for Quality
Assurance Belians by:

Ber. O

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Pess/W/Comb. 9/17/96

Priority Pollutant List Metal Compounds Water Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-WS-MW	-1	GL-WS-MW-1 I	DUPE	GL-WS-MW	-2	GL-WS-MW	1-3
DATE COLLECTED:	}	7/24/96		7/24/96		7/23/96		7/24/96	
MOISTURE CONTENT:		N/A		N/A		N/A	İ	N/A	
MATRIX:		WATER		WATER		WATER		WATER	
ANALYTE	UNITS								
Antimony	mg/L	0.010	υ)	0.010	υ	0.010	บ	0.010	U
Arsenic	mg/L	0.010	บ	0.010	บ	0.010	บ	0.010	U
Beryllium	mg/L	0.005	บ	0.005	υl	0.005	ַ ט	0.005	υ
Cadmium	mg/L	0.002	บ	0.002	U	0.002	บ	0.002	U
Chromium	mg/L	0.005	ប	0.005	บ	0.005	ע	0.005	U
Cobalt	mg/L	0.050	บ	0.050	บ (0.050	υ	0.050	U
Copper	mg/L	0.025	บ	0.025	υ	0.025	ט	0.025	U
Lead	mg/L	0.003	υ	0.003	υ	0.004]	0.0044	
Mercury	mg/L	0.0002	υ	0.0002	υ	0.0002	υ	0.0002	U
Nickel	mg/L	0.040	υ	0.040	υ	0.040	U	0.040	U
Selenium	mg/L	0.005	UJ	0.005	ບງ	0.005	UJ	0.005	UJ
Silver	mg/L	0.005	υ	0.005	υ∫	0.005	บ	0.005	U
Thallium	mg/L	0.010	U	0.010	υ	0.010	υ	0.010	U
Zinc	mg/L	0.050	บ	0.050	U	0.050	U	0.050	U

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- NA Not Analyzed.
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Assurance Release by:	0
	Date 9/17/86

File: Metals/W/Comb

Priority Pollutant List Metal Compounds Water Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-WS-MW	'4	GL-WS-MW	-5	GL-WS-MW	-6	GL-WS-MW	-7
DATE COLLECTED:		7/22/96	l	7/23/96	l	7/23/96	1	7/23/ 96 N/A	
MOISTURE CONTENT:		N/A	ŀ	N/A	1	N/A	1		
MATRIX:		WATER	l	WATER		WATER		WATER	
ANALYTE	UNITS								
Antimony	mg/L	0.010	ט	0.010	ט	0.010	υ	0.010	U
Arsenic	mg/L	0.025		0.034		0.073		0.16	
Beryllium	mg/L	0.005	υ	0.005	υ	0.005	U	0.005	U
Cadmium	mg/L	0.002	υ	0.002	υ	0.002	υ	0.0047	
Chromium	mg/L	0.035		0.027		0.014	1	0.063	
Cobalt	mg/L	0.050	υ	0.050	υ	0.050	U	0.065	
Co pper	mg/L	0.057		0.038		0.025	υ	0.16	1
Lead	mg/L	0.026	İ	0.016		0.0074		0.067	
Mercury	mg/L	0.0002	υ	0.0002	U	0.0002	υ	0.0002	U
Nickel	mg/L	0.074		0.063		0.040	υ	0.19	
Selenium	mg/L	0.010	ן נט	0.005	ען	0.020	UJ	0.010	UJ
Silver	mg/L	0.005	υİ	0.005	υ	0.005	U	0.005	U
Thallium	mg/L	0.010	υ	0.010	ַ ט	0.010	U	0.010	U
Zinc	mg/L	0.18		0.14	-	0.072		0.40	

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- N/A Not applicable.
- NA Not Analyzed.
 - * This sample is an Equipment Rinsate Blank.

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Rev. 6

1191: 9/17/76

ile: Metals/W/Comb

C riority Pollutan List Metal Compounds Water Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-WS-MW	-8	GL-WS-DECON V	WATER	GL-WS-ER-2	201*	GL-WS-ER-	202*
DATE COLLECTED:		7/22/96		6/24/96		6/27/96	j	7/10/96	
MOISTURE CONTENT:	ļ	N/A		N/A	1	N/A	N/A		1
MATRIX:		WATER		WATER		WATER		WATER	
ANALYTE	UNITS								
Antimony	mg/L	0.010	υ	0.010	บ	0.010	. บ	0.010	U
Arsenic	mg/L	0.044		0.010	υ	0.010	U	0.010	U
Beryllium	mg/L	0.005	U	0.005	Մ (0.005	υ	0.005	U
Cadmium	mg/L	0.0079		0.002	บ	0.002	U	0.002	U
Chromium	mg/L	0.10	ı	0.005	บ	0.005	U	0.005	U
Cobalt	mg/L	0.095		NA		NA		NA	
Copper	mg/L	0.29		0.025	υ	0.025	บ	0.025	U
Lead	mg/L	0.096		0.003	U	0.003	U	0.003	U
Mercury	mg/L	0.0002	Ū	0.0002	U	0.0002	บ	0.0002	U
Nickel	mg/L	0.21		0.040	υ	0.040	บ	0.040	U
Selenium	mg/L	0.010	UJ	0.005	ບງ	0.005	บ	0.005	U
Silver	mg/L	0.005	U	0.005	บ	0.005	U	0.005	U
Thallium	mg/L	0.010	บ	0.010	UJ	0.010	บ	0.010	U
Zinc	mg/L	0.69		0.050	บ	0.050	U	0.050	U

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- NA Not Analyzed.
 - * This sample is an Equipment Rinsate Blank.

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Appendix F Background Soil Sample Analytical Results

Priority Pollocat List Metals Background Soil Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

		GL-SS-BC)-I	GL-SS-BG-1	DUPE	GL-SS-B	G-1	GL-SS-BC	G-2	GL-SS-BC	G-2	GL-SS-B	G-3
DEPTH (Feet):	l	0.5-1.0	[0.5-1.0		1.5-2.	0	0.5-1.0)	1.5-2.0		0.5-1.0	0
DATE COLLECTED:	l	6/26/96	5	6/26/96	5	6/26/	96	6/26/9	6	6/26/9	6	6/26/9	96
MOSITURE CONTENT:	-	80.9		79.8		74		78.4		73.3		76.9	
MATRIX:		SOLID		SOLID		SOLII	D	SOLID)	SOLID)	SOLII	D
ANALYTE U	VITS							· -					
Antimony m	g/kg	1.2	ບງ	1.3	ບງ	1.4	ບງ	1.3	ບງ	1.4	. UJ	1.3	UJ
Arsenic m	g/kg	11.9	J	6.3	J	7.6	J	5.2	J	6.1	J	6.9	J
Beryllium m	g/kg	0.62	UJ	0.63	UJ	0.68	UJ	0.64	UJ	0.68	UJ	0.65	UJ
Cadmium m	/kg	0.40		0.41		0.41		0.77		0.59		0.59	
Chromium m	/kg	8.4		9.6		7.8		8.7		9.8		8.6	
Copper m	/kg	12.2		12.4		10.8		16.7		16.5		10.7	
Lead m	/kg	8.9	J	9.3	J	9.1	J	9.3	J	10.7	J	11.1	J
Mercury m	g/kg	0.12	υ	0.13	υ	0.14	υ	0.13	ប	0.14	U	0.13	บ
Nickel m	g/kg	9.7		10.6		10.5		9.6		11.3		12.8	
Selenium m	g/kg	0.62	UJ	0.63	UJ	0.68	UJ	0.64	UJ ,	0.68	UJ	0.65	UJ
Silver m	g/kg	0.62	υj	0.63	U	0.68	ប	0.64	ប	0.68	U	0.65	υ
Thallium m	g/kg	1.2	UJ	1.3	UJ	1.4	UJ	1.3	UJ	1.4	UJ	1.3	UJ
	g/kg	52.9	J	54.1	J	54.5	J	48.8	J	52.9	J	50. <i>7</i>	J

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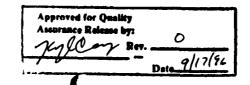
Date 9/17/96

Metals/S/comb. 9/17/98

Priority Ponutant List Metals Background Soil Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

	l l	GL-SS-BG-3		GL-SS-BC	j-4	GL-SS-BC	3 -4	GL-SS-BC	G-5	GL-SS-BC	j-5	GL-SS-BC	G-6
DEPTH (Feet):		1.5-2.0		0.5-1.0		1.5-2.0		0.5-1.0		1.5-2.0		0.5-1.0	
DATE COLLECTE	Dt	6/26/9	6	6/28/9	6	6/28/9	6	6/28/9	6	6/28/9	5/28/96 7/2/		6
MOSITURE CONT	ENT:	80.2		78.5		82.3	1	81.9		83.4	ŀ	90.5	
MATRIX:		SOLID		SOLID	, [SOLID)	SOLID)	SOLID		SOLIT)
ANALYTE	UNITS		1				ĺ	_					
Antimony	mg/kg	1.2	UJ	1.3	υJ	1.2	UJ	1.2	υJ	1.2	UJ	1.1	UJ
Arsenic	mg/kg	14.1	J	3.5	J	6.9	J	7.4	J	8.8	J	4.5	J
Beryllium	mg/kg	0.62	υJ	0.64	υj	0.61	UJ	0.61	UJ	0.60	UJ	0.55	υ
Cadmium	mg/kg	0.37	1	0.50	1	0.50	}	0.66	1	0.98		0.52	
Chromium	mg/kg	8.4	1	9.4	ŀ	8.9		9.0	ļ	7.5		9.0	
Copper	mg/kg	8.4	1	11.8		11.4		12.0		10.7		15.8	J
Lead	mg/kg	8.7	J	10.0	J	9.6	J	9.8		8.5	J	9.2	J
Mercury	mg/kg	0.12	υ	0.13	บ	0.12	U	0.12	บ	0.12	U	0.11	υ
Nickel	mg/kg	10.0		11.5	1	11.9		11.5		10.3		8.8	J
Selenium	mg/kg	0.62	ען	0.64	UJ	0.61	. UJ	1.2	UJ	1.2	UJ	0.55	UJ
Silver	mg/kg	0.62	U	0.64	ע	0.61	บ	0.61	U	0.60	U	0.55	U
Thallium	mg/kg	1.2	υj	1.3	IJ	1.2	ບງ	1.2	ບຸ	1.2	UJ	1.1	U
Zinc	mg/kg	49.5	j	52.3	J	52.3	J	55.1	J	49	J	47.8	J

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Priority Poutant List Metals Background Soil Analytical Results The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATIO)N: j	GL-SS-BO	G-6	GL-SS-BC	G-7	GL-SS-BG-7	DUPE	GL-SS-B	G-7	GL-SS-B	G-8	GL-SS-B	G-8
DEPTH (Feet):	1	1.5-2.0) [0.5-1.0)	0.5-1.0)	1.5-2.0)	0.5-1.0)	1.5-2.0	0
DATE COLLECTE): 	7/2/9	6	7/2/96	5	7/2/9	6	7/2/9	6	7/2/9	6	7/2/9	6
MOSITURE CONT	ENT:	89.1		85.6		84.8	- 1	82.5		86.5		85.5	
MATRIX:		SOLIE)	SOLIE)	SOLID)	SOLIE)	SOLII)	SOLII	D
ANALYTE	UNITS					1							
Antimony	mg/kg	1.1	UJ	1.2	UJ	1.2	UJ	1.2	UJ	1.2	UJ	1.2	UJ
Arsenic	mg/kg	3.2	J	5.0	J	4.9	J	6.7	j	3.6	J	4.6	J
Beryllium	mg/kg	0.56	ט	0.58	U	1.2	υ	0.61	υ	0.58	υ	0.58	U
Cadmium	mg/kg	0.57		0.58		0.43		0.55		0.47		0.57	
Chromium	mg/kg	12.0	l	8.3		9.3		8.2		8.3		8.2	
Copper	mg/kg	16.6	J	17.6	J	19.0	J	17.6	J	17.0	J	17.6	J
Lead	mg/kg	9.8	J	10.5	J	15.9	J	10.5	J	10.1	J	10.8	J
Mercury	mg/kg	0.11	υ	0.12	U	0.12	บ	0.12	U	0.12	υ	0.12	U
Nickel	mg/kg	9.9	J [11.0	J	18.1	J	10.9	J	10.4	J	11.0	J
Selenium	mg/kg	0.56	ບຸ	0.58	UJ	0.59	UJ	0.61	UJ	0.58	UJ	0.58	UJ
Silver	mg/kg	0.56	υ	0.58	U	1.2	บ	0.61	U	0.58	U	0.58	υ
Thallium	mg/kg	1.1	υ	1.2	U	2.4	บ	1.2	U	1.2	U	1.2	ប
Zinc	mg/kg	47.5	J	47.5	J	57.2	J	48.3	J	44.3	J	45.6	J

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Date 9/0/56

Metals/\$/comb. 9/17/96

Appendix G Soil Background Metals Concentration Calculations

Metals Luckgrounds Greiners Lagoon Fremont, Ohio

0.5 to 1.0 Feet

	Distribution	Mean mg/kg	SD mg/kg	Background mg/kg
Arsenic	Normal			
		6.00	2.76	11.5
Cadmium	Normal	0.56	0.12	0.8
Chromium	Normal	8.71	0.39	9.5
Copper	Normal	14.23	2.80	19.8
Lead	Normal	9.86	0.73	11.3
Nickel	Normal	10.66	1.29	13.2
Zinc	Normal	49.93	3.49	56.9

Distributions are Normal, Log-Normal, Other based on W-Test and graphical interpretation. and graphical interpretation.

Backgrounds are calculated as Mean + 2 * SD

0.5 to 2.0 Feet

	Distribution	log Mean mg/kg	Log SD mg/kg	Mean (A)	SD (B)	Background mg/kg
Arsenic	Log Normal	1.81	0.42	6.64	2.30	11.2
Cadmium	Log Normal	-0.60	0.24	0.56	0.80	2.2
Chromium	log Normal	2.17	0.11	8.78	2.24	13.3
Copper	Log Normal	2.61	0.24	14.00	2.80	19.6
Lead	Nórmal			9.79	0.79	11.4
Nickel	Normal	·		10.69	1.00	12.7
Zinc	Normal			49.94	3.15	56.2

- (A) The mean for log data (From Gilbert) is exp{logMean + [(SD^2)/2]}
- (B) The sample standard deviation for log data is (from Gilbert) SQRT[exp[(2*logmean+logSD)*(exp(Var)-1)]}

Metals bunkgrounds Greiners Lagoon Fremont, Ohio

1.5 to 2.0 Feet

	Distribution	log Mean mg/kg	Log SD mg/kg	Mean (A)	SD (B)	Background mg/kg
Arsenic	Normal			7.25	3.26	13.8
Cadmium	Log Normal	-0.61	0.29	0.57	0.80	2.2
Chromium	Normal			8.85	1.45	11.8
Copper	Normal			13.70	3.73	21.2
Lead	Normal			9.71	0.90	11.5
Nickel	Normal			10.73	0.68	12.1
Zinc	Normal			49.95	3.02	56.0

- (A) The mean for log data (From Gilbert) is exp{logMean + [(SD^2)/2]}
- (B) The sample standard deviation for log data is (from Gilbert) SQRT(exp[(2*logmean+logSD)*(exp(Var)-1)])

W-Test and Graphs Both Horizons 0.5-2.0 Feet

BACKGROUN. ÆTALS DATA SHAPIRO-WILK TEST GREINER'S LAGOON SITE FREMONT, OHIO

1		Amenic	_		Cadmium	_	· · · · · · · · · · · · · · · · · · ·	Chromium	
	mg/kg	Log (mg/kg)	(XI-Xbar)^2	mg/kg	Log (mg/kg)	(Xi-Xbar)^2	mg/kg	Log (mg/kg)	(XI Abar)^2
	3.2	1-16315081	0.412420615	0.37	-0.994252273	0 154621055	7.5	2 014903021	0.023092707
	3.5	1 252762968	0.305353128	0.40	0.916290732	0.099387164	7 H	2 054123734	0.012710789
	3.6	1 280933845	0 275012968	0.41	-0 891598119	0 084427836	H 2	2 104134154	0.003935268
	4.5	1.504077397	0.090765564	0.47	-0 755022584	0.023712658	8 2	2 104134154	0 00343 52 68
	46	1.526056303	0.078005323	0.50	-0.693147181	0.008484942	8.3	2 116255515	0.002561408
	5.0	1 609437912	0.038381795	0.50	-0 693147181	0.008484942	8.3	2 116255515	0.002561400
ľ	5.2	1.648658626	0 024552386	0.52	0 653926467	0.002797673	8.4	2 128231706	0.001492598
	61	1 808288771	8 63265E-06	0.55	-0 597837001	1 02172E 05	8.4	2 128231706	0.001492590
	6.7	1 902107526	0.009361896	0.57	0.562118918	0.00151434	H 6	2 151762203	0.00022812
	64	1 931521412	0.015919065	0.57	0.562118918	0.001514.14	B 7	2 16 1 12 3026	1.25517E-0
	64	1 931521412	0.015919065	0.58	0.544727175	0.003120395	я ч	2 186051277	о соолынон
	7.4	2 00148	0.038466728	0.59	0.527632742	0.005387662	9.0	2 197224577	0.00092165
ļ	76	2 028148247	0.049638776	0 59	0.527632742	0 005 387662	9.0	2 197224577	0.00092365
	8.8	2 174751721	0.136457163	0.66	0.415515444	0.034416925	9.4	2 240709689	0.0054529
	119	2 4765384	0.450493012	0.77	0.261364764	0.115374806	9.8	2 282382386	0.01334406
}	14.)	2 646174797	0.706985273	0.98	0.020202707	0.337364333	12.0	2 48490665	0.10114993
MEAN (=X bar)		1 8054			-0 6010			2 1869	.,,
Sum of (Xi-Xbar)^2		đ	2.65		đ	0 89		đ	0 17
number of samples		n	16		n	16		n	16
k :n/2 (n nven), k≖(n-1)/2 (n odd)		k	8 0000		k	8 0000		k	B 0000
Table A6, (Gilbert, 1987)		n 1	0 5056		a 1	0 5056		a 1	0 5056
Table A6, (Gilbert, 1987)		a2	0 3290		u 5	0 3290		82	0 3290
Table A6, (Gilbert, 1987)		a 3	0.2521		e3	0.2521		83	0 2521
Table A6, (Gilbert, 1987)		84	0.1939		e 4	0.1939		84	0 1939
Table A6. (Gilbert, 1987)		85	0.1447		85	0.1447		a5	0 1447 0 1003
Table A6, (Gilbert, 1987)		a6	0.1003		86	0.1003		a6	0.0593
Table A6. (Gilbert, 1987)		87	0.0593		a7 a8	0.0593 0.0196		a7 a8	0.0593
Table A6, (Gilbert, 1987) Equation 12.4 (Gilbert, 1987)		a8 W	0.0196 0.9658		ao W	0.0196		uo W	0.8575
Equation 12.4 (Glibert, 1967)			0.8000		• •	0.3301		• • • • • • • • • • • • • • • • • • • •	0.0313
		Norm if			Norm II			Norm If	
Table A7 (Gilbert, 1987), 95% Confidence		W>0.8870	0.8870		W>0.8870	0.8870		W>0.8870	0.8870
If W>(95% confidence), then Normal Distribution		Distribution	Norm		Distribution	Other		Distribution	Other

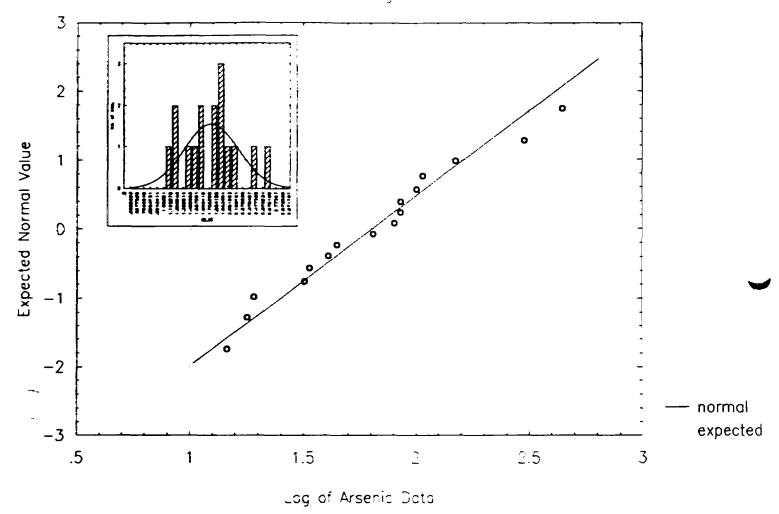
Other Indicates that neither the real data nor its logarithm is normally distributed. In this case, background statistics are derived from the untransformed data.

BACKGROU ETALS DATA SHAPIRO-WILK TEST GREINER'S LAGOON SITE FREMONT, OHIO

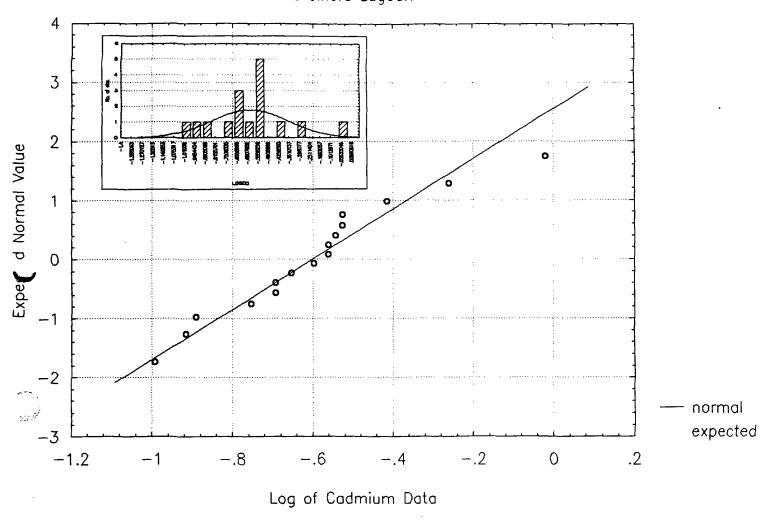
		Copper		Le	ad	Nic	kel	Z	nc
	mg/kg	Ln Cu	(Xi-Xbar)^2	mg/kg	(Xi-Xbar)^2	mg/kg	(Xi-Xbar)^2	mg/kg	(Xi-Xbar)^2
	8.4	2.128231706	0.232185765	8.5	1.65765625	8.8	3.586289063	44.3	31.78140625
	10.7	2.370243741	0.057525406	8.7	1.18265625	9.6	1.196289063	45.6	18.81390625
	10. 7	2.370243741	0.057525406	8.9	0.78765625	9.7	0.987539063	47.5	5.94140625
	10.8	2.379546134	0.053149684	9.1	0.47265625	9.9	0.630039063	47.5	5.94140625
	11.4	2.433613355	0.031143402	9.2	0.34515625	10.0	0.481289063	47.8	4.56890625
	11.8	2.468099531	0.020160807	9.3	0.23765625	10.3	0.155039063	48.3	2.68140625
1	12.0	2.48490665	0.015670442	9.6	0.03515625	10.4	0.086289063	48.8	1.29390625
Ì	12.2	2.501435952	0.01180533	9.8	0.00015625	10.5	0.037539063	49	0.87890625
·]	15.8	2.76000994	0.022476502	9.8	0.00015625	10.9	0.042539062	49.5	0.19140625
	16.5	2.803360381	0.037354102	10.0	0.04515625	11.0	0.093789062	50.7	0.58140625
1	16.6	2.809402695	0.039726233	10.1	0.09765625	11.0	0.093789062	52.3	5.58140625
<u> </u>	16.7	2.815408719	0.04215648	10.5	0.50765625	11.3	0.367539062	52.3	5.58140625
	17.0	2.833213344	0.049784791	10.5	0.50765625	11.5	0.650039062	52.9	8.77640625
1	17.6	2.867898902	0.066466313	10.7	0.83265625	11.5	0.650039062	52.9	8.77640625
1	17.6	2.867898902	0.066466313	10.8	1.02515625	11.9	1.455039063	54.5	20.81640625
	17.6	2.867898902	0.066466313	11.1	1.72265625	12.8	4.436289063	55.1	26.65140625
MEAN (=X bar)		2.6101		9.7875		10.6938		49.9375	
Sum of (Xi-Xbar)^2		d	0.87	d	9.46	ď	14.95	d	148.86
number of samples		n	16	n	16	n	16	n	16
k=n/2 (n even); k=(n-1)/2 (n odd)		k	8.0000	k	8.0000	į k	8.0000	k	8.0000
Table A6, (Gilbert, 1987)		a1	0.5056	a1	0.5056	a1	0.5056	a1	0.5056
Table A6, (Gilbert, 1987)		a2	0.3290	a2	0.3290	a2	0.3290	a2	
Table A6, (Gilbert, 1987)		a3	0.2521	a3	0.2521	a3	0.2521	a3	0.2521 0.1939
Table A6, (Gilbert, 1987)		a4	0.1939	a4	0.1939	a4 a5	0.1939 0.1447	a4 a5	
Table A6, (Gilbert, 1987)		a5 a6	0.1447 0.1003	a5 a6	0.1447 0.1003	a5 a6	0.1447	a5 a6	
Table A6, (Gilbert, 1987)		a6 a7	0.1003	a6 a7	0.1003	a7	0.1003	a7	
Table A6, (Gilbert, 1987) Table A6, (Gilbert, 1987)		a7 a8	0.0593	a8	0.0393	a8	0.0393	a8	
Equation 12.4 (Gilbert, 1987)		ao W	0.8591	w	0.9661	l www	0.9889	l w	
Equation 12.4 (Gilbert, 1967)		• •	0.0001	Norm if	0.000	Norm if	0.0000	Norm if	
1		Norm if		ſ		W>0.8870		W>0.8870	
Table A7 (Gilbert, 1987), 95% Confidence		W>0.8870	0.8870	W>0.8870	0.8870	VV>0.08/U	0.8870	W > 0.88 / 0	0.8870
If W>(95% confidence), then Normal Distribution		Distribution	Other	Distribution	Norm	Distribution	Norm	Distribution	Norm

Other Indicates that neither the real data nor its logarithm is normally distributed. In this case, background statistics are derived from the untransformed data.

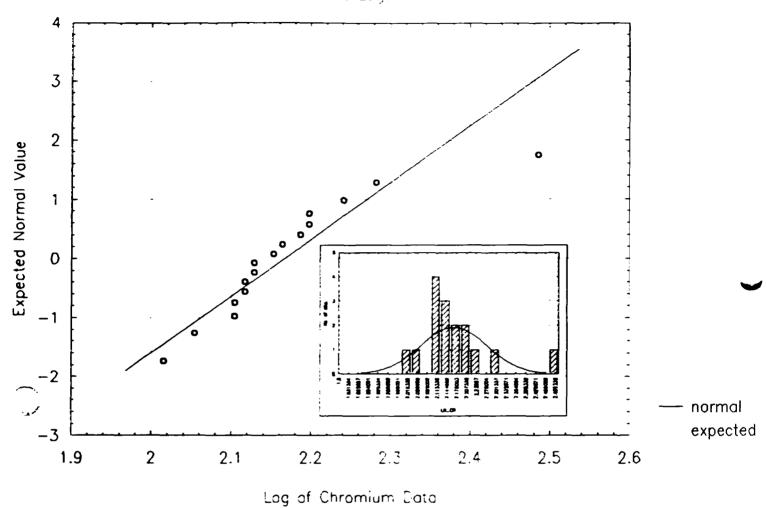
Lag of Arsenia Data Metais Backgrounds : 0.5 to 0.0 Feet Greiners Lagdon



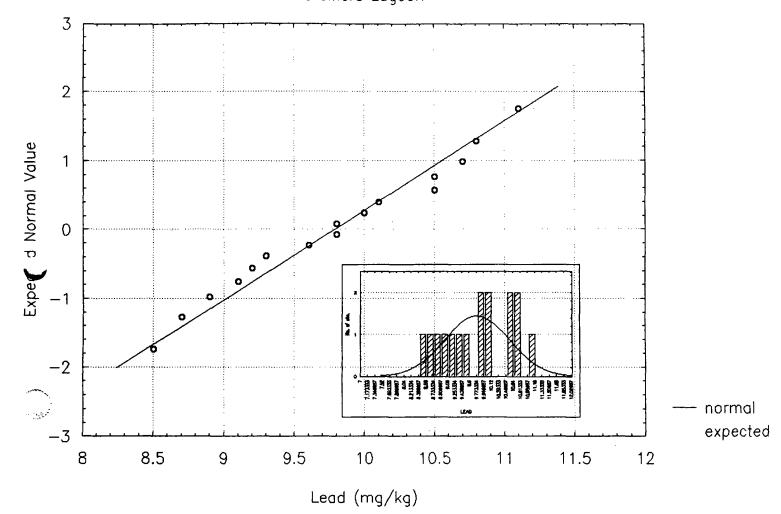
Log of Cadmium Data Metals Backgrounds : 0.5 to 2.0 Feet Greiners Lagoon



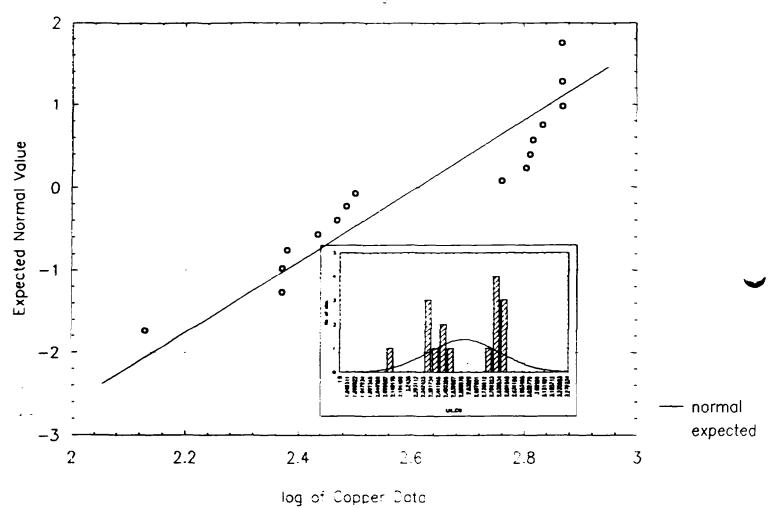
Log of Chromium Data Metals Backgrounds : 0.5 to 0.0 Feet Greners Lagonn



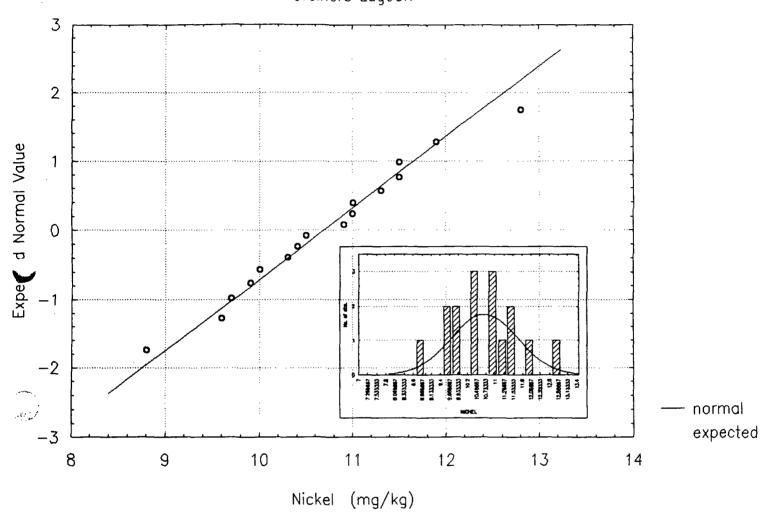
Lead Data Metals Backgrounds : 0.5 to 2.0 Feet Greiners Lagoon



Log of Copper Data Metais Backgrounds : 0.5 to 0.0 Feet Grieners Lagoon



Nickel Data Metals Backgrounds : 0.5 to 2.0 Feet Greiners Lagoon



normal expected

-2

-3

Zinc (mg/kg)

W-Test and Graphs Lower Horizon 1.5-2.0 Feet

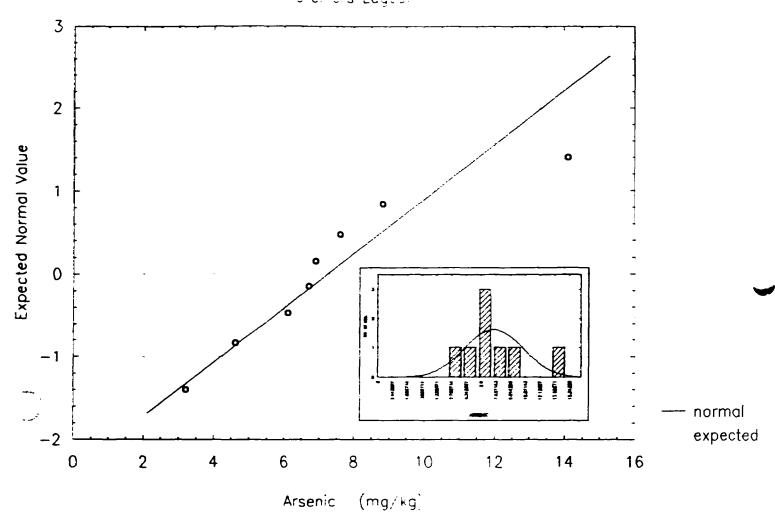
BACKGROL . ÉTALB DATA SHAPIRO-WILK TEST SAMPLE INTERVAL 1.5'-2.0' GREINER'S LAGOON FREMONT, CHIO

	Arm	mic		Cadmium		Chri	mium	Copp	rf
	mg/kg	(XI-Xbar)^2	mg/kg	Log Cd	(Xi-Xbar)^2	mg/kg	(Xi Xhar)^2	mg/kg [(Xt Xbar)^2
	3.2	16 4025	0.37	0 994252273	0.150651721	7.5	1 8225	H4	2H (N
	46	7 0225	0.41	-0 891598119	0.081501478	7 R	1 1025	10.7	¥
	6.1	1.3225	0.50	0 693147181	0.007574865	H 2	0.4225	10.8	H 41
	67	0.3025	0.55	0 597837001	6 B50011: 05	H 2	0 4225	11.4	5 29
	69	0.1225	0 57	-0.562118918	0 001935522	8.4	U 2U25	16.5	7 H4
1	76	0 1225	0.57	-0.562118918	0.001935522	89	0.0025	16.6	8.41
	**	2 4025	0.59	0.527632742	0.006159227	ИВ	0.9025	17 6	15.21
	14.1	46 9225	0.98	0 020202707	0.343291436	12.0	9 9225	17 6	15.21
MEAN (=X bar)	7 2500			-0 6061		8 8500		13 7000	
Mean of (XI-Xbar)^2	d	74 62		d	0 59	d	14 80	d	97.46
number of samples	n	8		n	8	n	8	n	8
k=n/2 (n even); k=(n-1)/2 (n odd)	k	4 0000		k	4 0000	k	4 0000	k	4 0000
Table A6, (Gilbert, 1987)	a1	0 6052		a1	0 6052	. a1	0 6052	a 1	0 6052
Table A6, (Gilbert, 1987)	a2	0 3164		a 2	0.3164	a2	0 3164	n2	0 3164
Table A6, (Gilbert, 1987)	■3	0 1743		a 3	0 1743	a 3	0.1743	n3	0 1743
Table A5, (Gilbert, 1987)	#4	0 0561		84	0 0561	84	0 0581	n4	0 0561
Equation 12.4 (Gilbert 1987)	W	0 900709932		W	0 897230187		0 822710927	W	0.8400083
	Norm if			Norm if		Norm if		Norm if	0.010
Table A7 (Gilbert, 1987), 95% Confidence	W>0 818	0 818		W>0 818	0 818	W-0 B18	0.818	W=0.818	0.818
If W-(95% confidence), then Normal Distribution	Distribution	Norm		Distribution	Norm	Distribution	Norm	Distribution	Norm

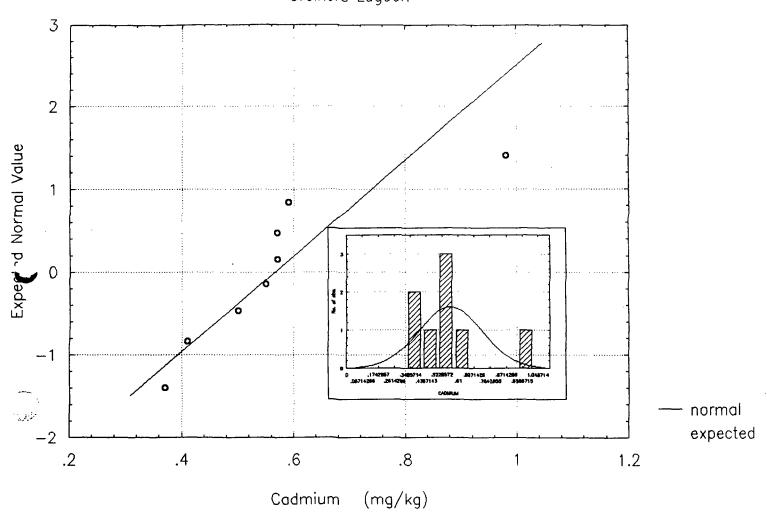
BACKGROU ETALS DATA SHAPIRO-WILK TEST SAMPLE INTERVAL 1.5'-2.0' GREINER'S LAGOON FREMONT, OHIO

	I	ead	Ni	ckel	2	Linc
	mg/kg	(Xi-Xbar)^2	mg/kg	(Xi-Xbar)^2	mg/kg	(Xi-Xbar)^2
	8.5	1.47015625	9.9	0.680625	45.6	18.9225
	8.7	1.02515625	10.0	0.525625	47.5	6.0025
	9.1	0.37515625	10.3	0.180625	48.3	2.7225
	9.6	0.01265625	10.5	0.050625	49	0.9025
	9.8	0.00765625	10.9	0.030625	49.5	0.2025
	10.5	0.62015625	11.0	0.075625	52.3	5.5225
	10.7	0.97515625	11.3	0.330625	52.9	8.7025
<u> </u>	10.8	1.18265625	11.9	1.380625	54.5	20.7025
MEAN (=X bar)	9.7125		10.7250		49.9500	
Mean of (Xi-Xbar)^2	d	5.67	d	3.26	d	63.68
number of samples	n	8	n	8	n	8
k=n/2 (n even); k=(n-1)/2 (n odd)	k	4.0000	k	4.0000	k	4.0000
Table A6, (Gilbert, 1987)	a1	0.6052	a1	0.6052	a1	0.6052
Table A6, (Gilbert, 1987)		0.3164	a2	0.3164	a2	0.3164
Table A6, (Gilbert, 1987)	a 3	0.1743	a3	0.1743	a 3	0.1743
Table A6, (Gilbert, 1987)	a4	0.0561	a4	0.0561	a 4	0.0561
Equation 12.4 (Gilbert 1987)		0.917027563	W	0.95832764	W	0.96032989
	Norm if		Norm if	1	Norm if	
Table A7 (Gilbert, 1987), 95% Confidence	W>0.818	0.818	W>0.818	0.818	W>0.818	0.818
If W>(95% confidence), then Normal Distribution	Distribution	Norm	Distribution	Norm	Distribution	Norm

Arsenic Data Metals Backgrounds : 1.5 to 2.0 Feet Greiners Lagoon



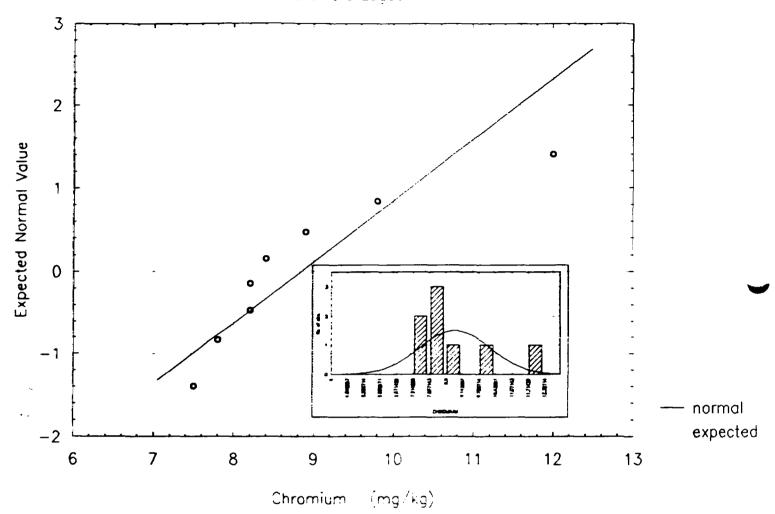
Cadmium Data Metals Backgrounds : 1.5 to 2.0 Feet Greiners Lagoon



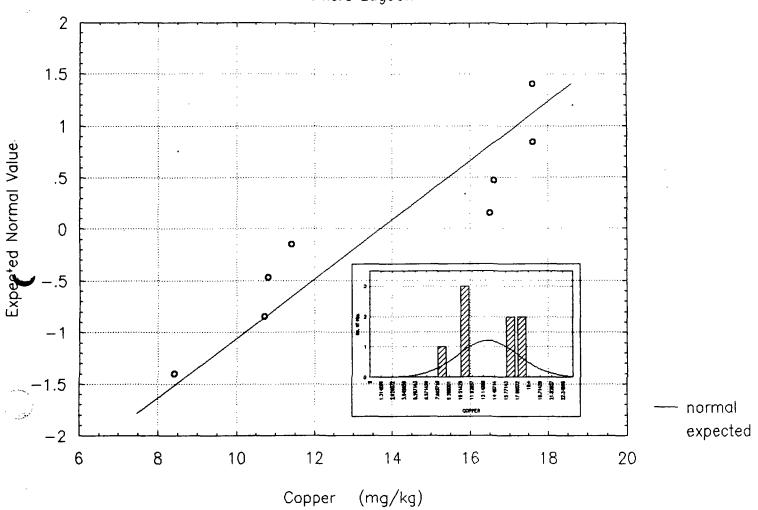
Onromium Data

Metals Backgrounds : 1.5 to 2.0 Feet

Greiners Lagoon



Copper Data Metals Backgrounds : 1.5 to 2.0 Feet Greiners Lagoon



Metals Backgrounds : 15 to 2.0 Feet

Greiners Lagron

2
1.5
1
-.5

10

10.5

11

normal expected

11.5

-1.5

-2

8

8.5

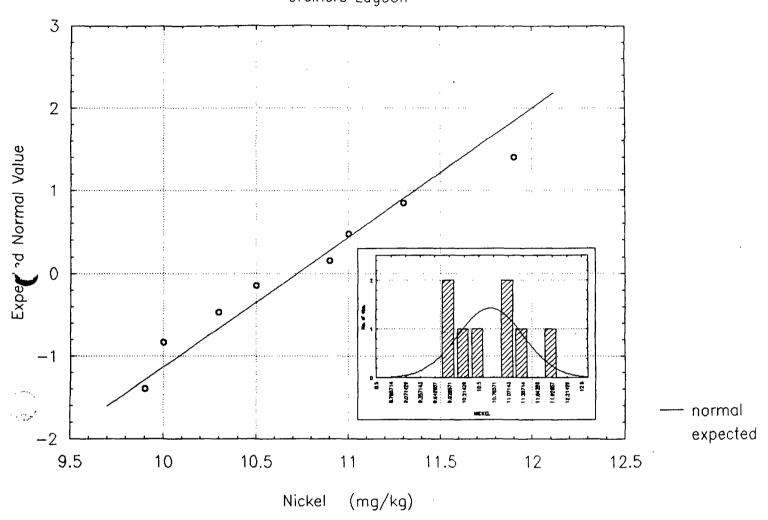
9

9.5

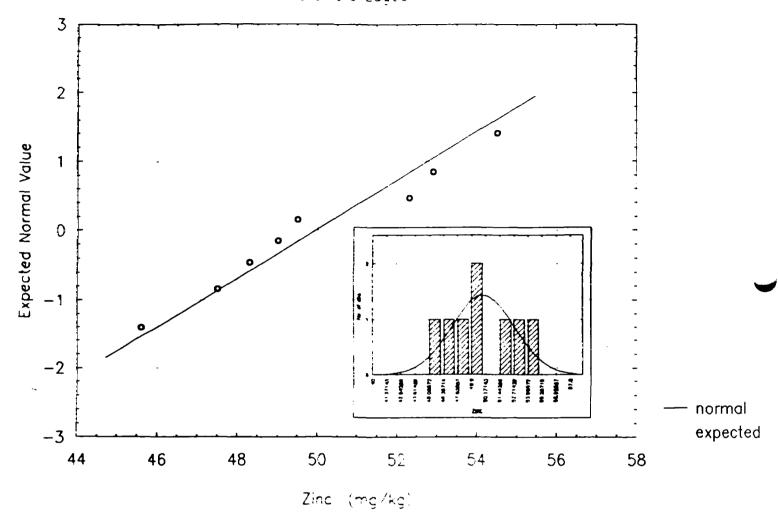
Lead (mg/kg)

Lead Data

Nickel Data Metals Backgrounds : 1.5 to 2.0 Feet Greiners Lagoon



Zinc Data Metals Backgrounds : 1.5 to 2.0 Feet Greiners Lagoon



W-Test and Graphs Both Horizons 0.5-2.0 Feet

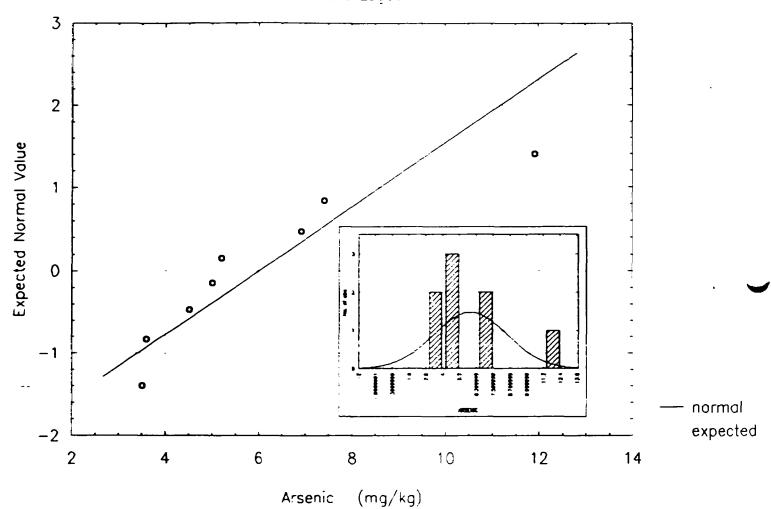
BACKGROUND METALS DATA SHAPIRO-WILK TEST SAMPLE INTERVAL 0.5'-1.0' GREINER'S LAGOON FREMONT, OHIO

	Ane	mic	Cadn	ilum	Chron	nium	Cop	per
	mg/kg	(XI-Xbar)^2	mg/kg	(XI-Xbar)^2	mg/kg	(Xi-Xbar)^2	mg/kg	(Xi-Xbar)^2
	3.5	6.25	0.40	0.026001563	8.3	0.17015625	10.7	12.425625
	3.6	5.76	0.47	0.008326563	8.3	0.17015625	11.8	5.880625
	4.5	2.25	0.50	0.003751563	8.4	0.09765625	12.0	4 950625
	5.0	1	0.52	0.001701563	8.6	0.01265625	12.2	4.100625
	5.2	0.64	0.58	0.000351562	8.7	0.00015625	15.8	2.480625
	6.9	0.81	0.59	0.000826562	9.0	0.08265625	16.7	6.125625
	7.4	1.96	0.66	0.009751563	9.0	0.08265625	170	7.700625
	11.9	34.81	0.77	0.043576563	9.4	0.47265625	17.6	11.390625
MEAN (=X bar)	8.0000		0.5613		8.7125	ľ	14 2250	
Mean of (XI-Xbar)^2	d	53.48	d	0.09	d	1.09	d	55 06
number of samples	n	8	n	8	n	8	n	8
k=n/2 (n even); k=(n-1)/2 (n odd)	k	4.0000	k	4.0000	k	4.0000	k	4 0000
Table A6, (Gilbert, 1987)		0.6052	a 1	0.6052	a1	0.6052	a 1	0 6052
Table A6, (Gilbert, 1987)		0.3164	a 2	0.3164	a2	0.3164	a2	0 3164
Table A6, (Gilbert, 1987)	a3	0.1743	a3	0.1743	a3	0.1743	a3	0.1743
Table A6, (Gilbert, 1987)	a4	0.0561	a4	0.0561	8.4	0.0561	u4	0 0561
Equation 12.4 (Gilbert 1987)	w	0 84327744	W	0.97431119		0.91369627	W	0 85037653
Table A7 (Gilbert, 1987), 95% Confidence	Norm If W>0.818	0.818	Norm If W>0.818	0.818	Norm if W>0.818	0.818	Norm if W>0.818	0.818
If W>(95% confidence), then Normal Distribution	Distribution	Norm	Distribution	Norm	Distribution	Norm	Distribution	Norm

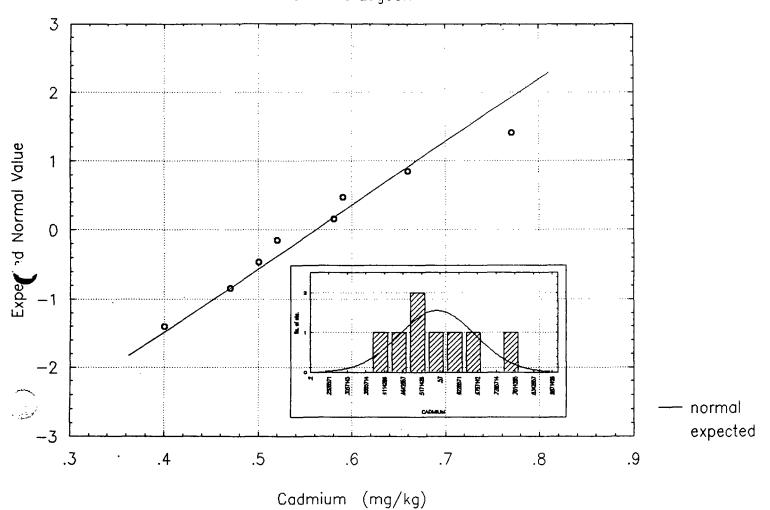
BACKGROU METALS DATA SHAPIRO-WILK TEST SAMPLE INTERVAL 0.5'-1.0' GREINER'S LAGOON FREMONT, OHIO

	Lea	ıd	Ziı	nc	N	ickel
	mg/kg	(Xi-Xbar)^2	mg/kg	(Xi-Xbar)^2	mg/kg	(Xi-Xbar)^2
	8.9	0.92640625	44.3	31.640625	8.8	3.46890625
	9.2	0.43890625	47.5	5.880625	9.6	1.12890625
	9.3	0.31640625	47.8	4.515625	9.7	0.92640625
}	9.8	0.00390625	48.8	1.265625	10.4	0.06890625
]	10.0	0.01890625	50.7	0.600625	11.0	0.11390625
	10.1	0.05640625	52.3	5.640625	11.5	0.70140625
[·	10.5	0.40640625	52.9	8.850625	11.5	0.70140625
1	11.1	1.53140625	55.1	26.780625	12.8	4.56890625
MEAN (=X bar)	9.8625		49.9250		10.6625	
Mean of (Xi-Xbar)^2	d	3.70	d	85.18	d	11.68
number of samples	n	8	n	8	n	8
k=n/2 (n even); k=(n-1)/2 (n odd)	k	4.0000	k	4.0000	k	4.0000
Table A6, (Gilbert, 1987)	a1	0.6052	a1	0.6052	a1	0.6052
Table A6, (Gilbert, 1987)	a2	0.3164	a2	0.3164	• a2	0.3164
Table A6, (Gilbert, 1987)	a3	0.1743	a3	0.1743	аЗ	0.1743
Table A6, (Gilbert, 1987)	a4	0.0561	a4	0.0561	a4	0.0561
Equation 12.4 (Gilbert 1987)	W	0.96925699	w	0.97986831	W	0.97207208
Table A7 (Gilbert, 1987), 95% Confidence	Norm if W>0.818	0.818	Norm if W>0.818	0.818	Norm if W>0.818	0.818
If W>(95% confidence), then Normal Distribution	Distribution	Norm	Distribution	Norm	Distribution	Norm

Arsenic Data Metals Backgrounds : 0.5 to 1.0 Feet Greiners Lagoon



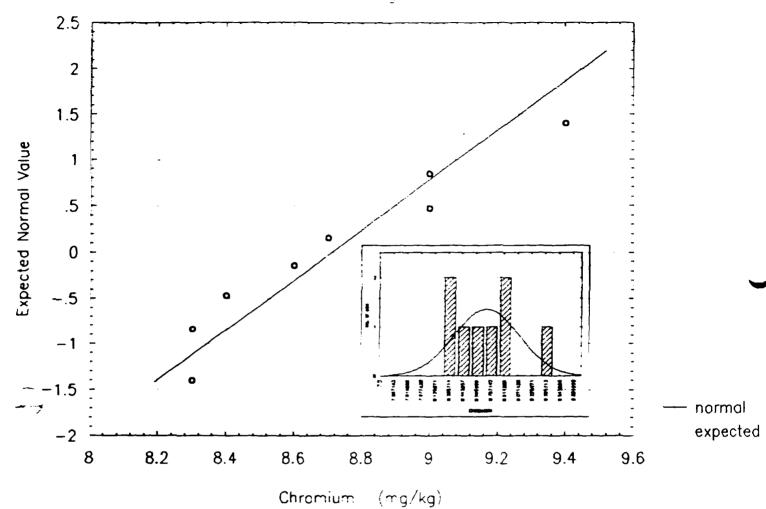
Cadmium Data Metals Backgrounds : 0.5 to 1.0 Feet Greiners Lagoon



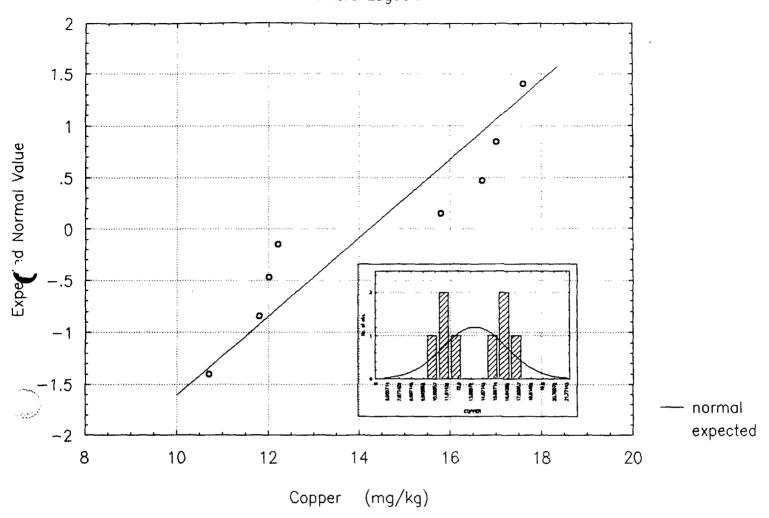
Obromium Data

Metals Backgrounds : 0.5 to 1.0 Feet

Greiners Laggar



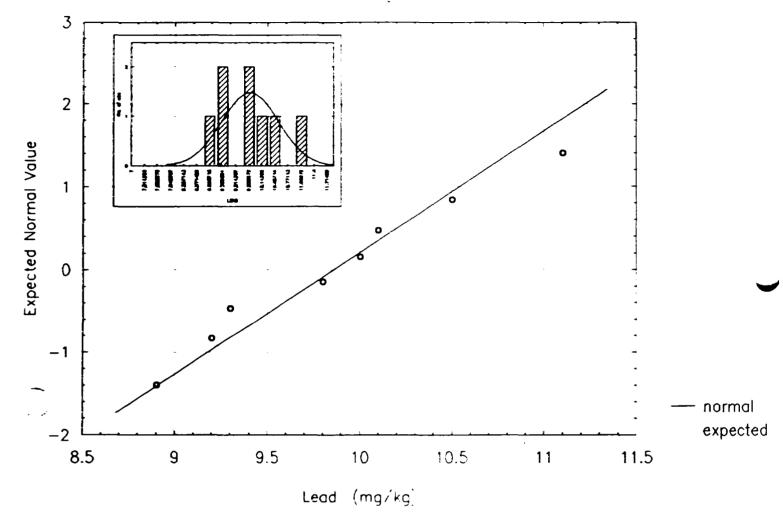
Copper Data Metals Backgrounds : 0.5 to 1.0 Feet Greiners Lagoon



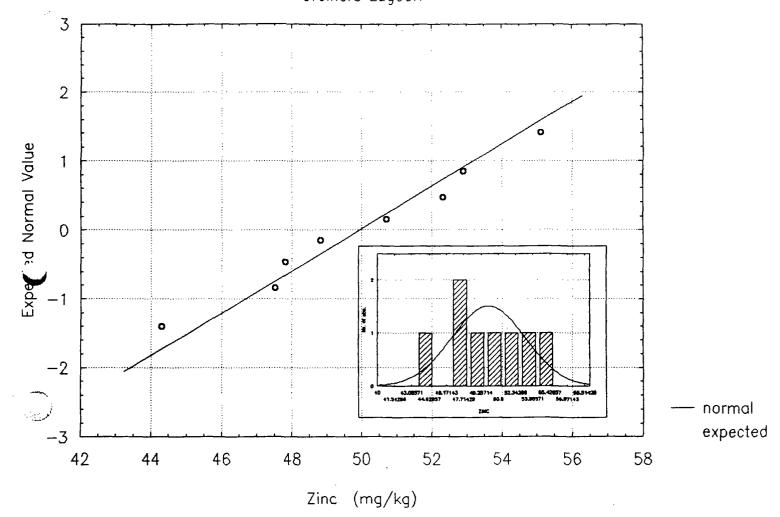
Lead Data

Metals Backgrounds : 0.5 to 2.0 Feet

Greiners Lagoor



Zinc Data Metals Backgrounds : 0.5 to 1.0 Feet Greiners Lagoon



Appendix H
Geoprobe Soil/Water Analytical
Results

Off-Site Laboratory

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Lubrizol Corporation
Greiner's Lagoon Site
Sandusky County, Ohio
Ground Water and Soil Samples
Collected 16 December 1996
Through 8 January 1997
In Association with the
Engineering Evaluation/Cost Analysis
(EE/CA) Site Investigation

12 February 1997

Environmental Resources Management, Inc. 855 Springdale Drive Exton, Pennsylvania 19341

File No.: 09928.00.01

ANALYTICAL QUALITY ASSURANCE REPORT

Lubrizol Corporation
Greiner's Lagoon Site
Sandusky County, Ohio
Ground Water and Soil Samples
Collected 16 December 1996
Through 8 January 1997
In Association with the
Engineering Evaluation/Cost Analysis
(EE/CA) Site Investigation

12 February 1997

Cheri A. Pearson

Quality Assurance Chemist

Joseph M. Loeper, Ph.D.

Technical Reviewer

Environmental Resources Management, Inc.

855 Springdale Drive Exton, Pennsylvania 19341 File No: 09928.00.01

TABLE OF CONTENTS

1.0	INT	1				
2.0	ORG	GANIC D	ATA	2		
	2.1	ORGA	NIC DATA QUALIFIERS	2		
		2.1.1	Soil Organic Data Qualifiers	2		
		2.1.2	Ground Water Organic Data Qualifiers	4		
3.0	INORGANIC DATA					
	3.1	INOR	GANIC DATA QUALIFIERS	6		
		3.1.1	Soil Inorganic Data Qualifiers	6		
		3.1.2	Ground Water Inorganic Data Qualifiers	7		
4 0	SITA	MARY		ç		

ATTACHMENTS

- 1 METHODOLOGY SUMMARY/METHOD REFERENCES
- 2 DATA SUMMARY TABLES

LIST OF TABLES

1-1 Summary of Data Reviewed

following page 1

This analytical quality assurance report is based upon a review of analytical data generated for ground water and soil samples and associated quality control samples collected 16 December 1996 through 8 January 1997 at the Lubrizol Corporation, Greiner's Lagoon Site located in Sandusky County, Ohio as part of the Engineering Evaluation/Cost Analysis (EE/CA) Site Investigation. The analytical methods which were used in these analyses are summarized and referenced in Attachment 1. The sample locations, laboratory sample identification numbers, dates of collection, and analyses performed are presented on Table 1-1. Data summary tables presenting the validated and/or qualified analytical results are provided in Attachment 2.

The analytical data were reviewed for adherence to the specified analytical protocols. The reported results for organic and inorganic analyses have been validated or qualified using general guidance provided by the "National Functional Guidelines for Organic (and Inorganic) Data Review", USEPA, 2/94 (and 2/94).

Table 1-1 Summary of Sample Data Reviewed Soil Samples

Sample Location	Laboratory ID Number	Date Sampled	Analyses Performed
GL-SS-GB-1(4-6')	A6L210119 001	12/16/96	[3]
GL-95-GB-2(6-8")	A6L210119 003	12/16/96	[1], [2]
GL-SS-GB-3(8-10')	A6L210119 004	12/17/96	[1], [2]
GL-SS-GB-4(6-8")	A6L210119 006	12/17/96	[1], [2], [3]
GL-SS-GB-5(6-8")	A6L210119 007	12/17/96	[1], [2]
GL-SS-GB-6(2-41)	A6L210119 008	12/17/96	[3]
GL-SS-GB-7(10-12')	A6L210119 010	12/18/96	[1], [2]
GL-SS-GB-8(2-41)	A6L210119 012	12/18/96	[3]
GL-SS-G8-10 (6-8")	A6L210119 013	12/18/96	[3]
GL-SS-GB-12(8-10')	A6L210119 014	12/19/96	[3]
GL-88-GB-13(4-6)	A6L210119 015	12/19/96	[3]
GL-SS-GB-15(4-6')	A61.210119 016	12/19/96	[3]
GL-66-GB-11(6-87)	A6L280103 001	12/19/96	[1], [2]
GL-85-GB-14(4-6')	A6L280103 002	12/19/96	[1], [2]
GL-SS-GB-15(4-6)	A6L280103 003	12/19/96	[1], [2]
GL-85-GB-15 (6-8*)	A6L280103 004	12/19/96	[1], [2]
GL-SS-GB-15(8-107)	A6L280103 005	12/19/96	[1], [2]
GL-SS-GB-17(2-41)	A6L280103 006	12/20/96	[1], [2]

ANALYSES PERFORMED CODES:

^{[1] -} Volatile Organic Compounds

^{[2] -} Semivolatile Organic Compounds [3] - Total Metals

Summary of Sample Data Reviewed (Continued) Table 1-1 Aqueous Samples

Sample Location	Laboratory ID Number	Date Sampled	Analyses Performed
GL-WS-GB-1	A6L210119 002	12/16/96	[3]
GL-WS-GB-3	A6L210119 005	12/17/96	[3]
GL-WS-GB-4	A6L210119 009	12/17/96	[3]
GL-WS-GB-7	A6L210119 011	12/18/96	[1], [2], [3]
GL-WS-GB-9	A6L210119 017	12/18/96	[3]
GL-WS-GB-11	A6L210119 018	12/19/96	[3]
GL-WS-GB-13	A6L210119 019	12/19/96	[3]
GL-WS-GB-15	A6L210119 020	12/20/96	[1], [2]
GL-WS-MW-3	A7A090116 001	1/8/97	[1]
TRIP BLANK	A6L210119 021	12/20/96	[1]
TB-1	A6L280103 007	12/27/96	[1]
TRIP BLANK	A7A090116 002	1/8/97	[1]

ANALYSES PERFORMED CODES:

^{[1] -} Volatile Organic Compounds [2] - Semivolatile Organic Compounds

^{[3] -} Total Metals

The organic analyses of the ground water and soil samples and their associated field quality control samples were performed by Quanterra Environmental Services of North Canton, Ohio. The samples were analyzed for selected volatile and semivolatile organic compounds, as indicated in Table 1-1. All sample analyses were performed according to the protocols specified in "Test Methods for Evaluating Solid Waste", SW-846, Third Edition, November 1986, updated July 1992. The methods used for these analyses are summarized and referenced in Attachment 1.

The findings offered in this report are based on a review of data generated according to a full data deliverables format for all samples. The following deliverables were evaluated for conformance with criteria: chain of custody documentation, holding times, laboratory method and travel blank analysis results, surrogate compound recoveries, matrix spike compound recoveries and reproducibility, bromofluorobenzene (BFB) and decafluorotriphenylphosphine (DFTPP) mass tuning results, initial and continuing calibration summaries, and internal standard performance summaries.

The organic analyses were performed acceptably, but require qualifying statements. It is recommended that the reported analytical results be used only with the qualifying statements provided in this report. Any aspects of the data which are not discussed in this report should be considered qualitatively and quantitatively valid as reported, based on the deliverables reviewed. Data summary tables presenting the validated and qualified results are provided in Attachment 2.

2.1 ORGANIC DATA QUALIFIERS

2.1.1 Soil Organic Data Qualifiers

• The samples listed in the following table were analyzed for volatile organic compounds and semivolatile organic compounds at initial dilutions and/or according to medium-level sample preparation protocols because of suspected high levels of target compounds in the samples. The initial dilutions/medium-level protocols were required to prevent saturation of the instrument and to allow quantitation of the compounds within the linear range of the calibration curve. However, higher quantitation limits have resulted for specific volatile organic compounds and/or semivolatile organic compounds which

were not detected in these samples. This should be noted when assessing these samples for the qualitative absence of specific volatile and semivolatile organic compounds.

Compounds	Sample	Fraction	Dilution Factor
Acetone, and 4-Methyl-2-Pentanone	GL-SS-GB-3(8-10')	VOAs	250X (Medium Level)
Phenol	GL-SS-GB-3(8-10')	SVOAs	20X
Acetone, Benzene, and 4-Methyl-2-Pentanone	GL-SS-GB-4(6-8')	VOAs	125X (Medium Level)
Phenol	GL-SS-GB-4(6-8')	SVOAs	10X
Acetone, and 4-Methyl-2-Pentanone	GL-SS-GB-7(10-12')	VOAs	10X
Acetone and 2-Butanone	GL-SS-GB-15(6-8')	VOAs	125X (Medium Level)
Phenol	GL-SS-GB-15(6-8')	SVOAs	10X
Acetone and 4-Methyl-2-Pentanone	GL-SS-GB-15(8-10')	VOAs	125X (Medium Level)
Phenol	GL-SS-GB-15(8-10')	SVOAs	6.66X

• The positive results reported for acetone and 4-methyl-2-pentanone in the samples listed in the following table should be considered quantitative estimates. Poor relative response factor (RRF) precision (>25% difference) between the initial calibration average RRF and the continuing calibration RRF associated with these samples was observed for these compounds. Poor continuing calibration RRF precision indicates a lack of instrument stability for these compounds in associated samples, and the positive results for acetone and 4-methyl-2-pentanone in these samples should be considered quantitative estimates. This has been indicated by placing "J" qualifiers next to the positive results for these compounds on the data summary table.

Compounds	Samples Affected
Acetone	GL-SS-GB-3(8-10°), GL-SS-GB-4(6-8°), GL-SS-GB-7(10-12°), GL-SS-GB-11(6-8°)
4-Methyl-2-Pentanone	GL-SS-GB-3(8-10°), GL-SS-GB-4(6-8°)

- The positive results and/or quantitation limits for acid-extractable semivolatile organic compounds in sample GL-SS-GB-2(6-8') should be considered biased low quantitative estimates and may be higher than reported. Low recoveries were obtained for the acid-extractable surrogate compounds phenol-d5 and 2-fluorophenol with the analysis of this sample. The low recoveries may be the result of extraction inefficiencies and/or matrix interferences present in the sample, and the positive results and/or quantitation limits for acid-extractable semivolatile organic compounds should be considered biased low quantitative estimates. This has been indicated by placing "J" qualifiers next to the positive results and quantitation limits for acid-extractable semivolatile organic compounds in sample GL-SS-GB-2(6-8'). The possibility of elevated quantitation limits should be noted when assessing this sample for the qualitative absence of acid-extractable semivolatile organic compounds.
- The reported quantitation limits for sample GL-SS-GB-17(2-4') using the volatile internal standard compounds 1,4-difluorobenzene and chlorobenzene-d5 should be considered quantitative estimates. The area counts for these internal standard compounds were below the quality control (QC) limit for the volatile organic compound analysis of this sample. The low area counts indicate the possible presence of matrix interferences in this sample, and the quantitation limits associated with these low internal standard areas should be considered quantitative estimates. This has been indicated by placing "J" qualifiers next to the associated quantitation limits for sample GL-SS-GB-17 (2-4').

2.1.2 Ground Water Organic Data Qualifiers

• The holding time for the volatile organic compound analysis of sample GL-WS-GB-15 exceeded the method holding time of 7 days from collection for unpreserved samples. Aromatic compounds in samples analyzed outside the seven day holding time may be subject to biological or chemical degradation. The quantitation limits reported for aromatic compounds in this sample should be considered quantitative estimates and may be higher than reported. This has been indicated by placing "J" qualifiers next to the

- quantitation limits for aromatic compounds in sample GL-WS-GB-15. The possibility of elevated quantitation limits should be noted when assessing the data for the qualitative absence of aromatic volatile organic compounds in this sample
- The positive result reported for bis(2-ethylhexyl)phthalate in sample GL-WS-GB-7 should be considered qualitatively invalid due to the levels at which this compound was present in the associated laboratory method blank. USEPA protocol requires positive sample results for common laboratory contaminants, such as bis(2-ethylhexyl)phthalate, that are less than or equal to ten times the level found in associated blanks, to be considered qualitatively invalid. This has been indicated by placing "B" qualifiers next to the reported quantitative results for bis(2-ethylhexyl)phthalate in sample GL-WS-GB-7.
- The positive results reported for the volatile organic compound analysis of sample GL-WS-MW-3 should be considered biased high quantitative estimates and may be lower than reported. A high recovery was obtained for the surrogate compound toluene-d8 with the analysis of this sample. This high recovery may be the result of matrix interferences present in this sample, and positive results reported for volatile organic compounds in this sample should be considered biased high quantitative estimates. This has been indicated by placing "J" qualifiers next to the positive results reported for sample GL-WS-MW-3.
- Sample GL-WS-MW-3 was analyzed for volatile organic compounds at an initial dilution of 2.5 because of suspected high levels of target compounds in the sample. The initial dilutions were required to prevent saturation of the instrument and to allow quantitation of acetone and 4-methyl-2-pentanone within the linear range of the calibration curve. However, higher quantitation limits have resulted for specific volatile organic compounds which were not detected in this sample. This should be noted when assessing sample GL-WS-MW-3 for the qualitative absence of volatile organic compounds.

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The inorganic analyses of the ground water and soil samples and their associated field quality control samples were performed by Quanterra Environmental Services of North Canton, Ohio. These samples were analyzed for selected total metals as indicated in Table 1-1. All sample analyses were performed according to the protocols specified in "Test Methods for Evaluating Solid Waste", SW-846, Third Edition, November 1986, updated July 1992. The methods used for these analyses are summarized and referenced in Attachment 1.

The findings in this report are based on a review of the data generated according to a full data deliverables format. The following deliverables were evaluated for conformance with criteria: chain of custody documentation, holding times, laboratory method blank results, matrix spike recoveries, detection limits/sensitivity, initial and continuing calibrations, laboratory control sample results, Inductively Coupled Plasma (ICP) Emission Spectroscopy interference check sample results, ICP serial dilution results, and Graphite Furnace Atomic Absorption (GFAA) Spectroscopy post-digestion spike recoveries.

The inorganic analyses were performed acceptably, but require qualifying statements. It is recommended that the analytical results be used only with the qualifying statements provided in this report. Any aspects of the data which are not discussed in this report should be considered qualitatively and quantitatively valid as reported, based on the deliverables reviewed. Data summary tables presenting the validated and qualified results are provided in Attachment 2.

3.1 INORGANIC DATA QUALIFIERS

3.1.1 Soil Inorganic Data Qualifiers

The positive results and/or detection limits reported for antimony, arsenic and selenium in all soil samples should be considered biased low quantitative estimates and may be higher than reported. The associated matrix spike recoveries were below the established quality control (QC) limit for these analytes. The low recoveries indicate the presence of matrix interferences in samples of a similar matrix. This has been indicated by placing "J" qualifiers next to the positive results and/or detection limits for these analytes on the data summary tables. The possibility of elevated detection limits should be noted

- when assessing the data for the qualitative absence of antimony, arsenic and selenium in these samples.
- The positive results reported for lead in all soil samples should be considered quantitative estimates. The ICP serial dilution analysis results associated with the soil samples exceeded the established precision criteria of 10 percent difference for this analyte. The lack of precision indicates the possible presence of physical or chemical interference in the analysis of lead for samples of a similar matrix. This has been indicated by placing "J" qualifiers next to the reported quantitative results for lead in all soil samples.

3.1.2 Ground Water Inorganic Data Qualifiers

• The positive results and/or detection limits reported for arsenic, mercury and selenium in all water samples should be considered biased low quantitative estimates and may be higher than reported. The associated matrix spike recoveries were below the established quality control (QC) limit for these analytes. The low recoveries indicate the presence of matrix interferences in samples of a similar matrix. This has been indicated by placing "J" qualifiers next to the positive results and/or detection limits for these analytes on the data summary tables. The possibility of elevated detection limits should be noted when assessing the data for the qualitative absence of arsenic, mercury and selenium in these samples.

4.0 SUMMARY

The organic and inorganic analyses were performed acceptably, but required a few qualifying statements. This analytical quality assurance report has identified the aspects of the data which required qualification. A support documentation package has been prepared for this quality assurance review and is located with the Lubrizol Corporation project file.

Attachment 1 Analysis Method References and Summaries

METHODOLOGY SUMMARY

Analysis for Volatile Organic Compounds by GC/MS

Soil samples were analyzed for volatile organic compounds by adding a five-gram (wet weight) sample aliquot to 5 milliliters (mL) of reagent water containing surrogate compounds and internal standards. Aqueous samples (5 mL) were fortified directly with surrogate compounds and internal standards for analysis. The soil or water samples were then purged with helium at ambient temperature. The volatile compounds were transferred from the aqueous phase to the vapor phase and trapped onto a sorbent column. After purging, the column was heated and back flushed to desorb the compounds onto a gas chromatographic column. The gas chromatograph was temperature programmed to separate the sample components, which were then detected by a mass spectrometer. The target compounds were qualitatively identified and quantitated through calibration with standards.

Analysis for Semivolatile Organic Compounds by GC/MS

Thirty grams (wet weight) of soil were extracted with 1:1 methylene chloride and acetone. Aqueous samples (1000 mL) were adjusted to the appropriate pH and extracted with methylene chloride. The extracts were then filtered, dried, and concentrated to the appropriate volume. The extracts were then analyzed by first separating the extract components using a gas chromatographic column and then detecting them with a mass spectrometer for qualitative and quantitative evaluation.

Analysis for ICP Metals

Prior to analysis, 100- milliliter or one gram sample aliquots were digested with nitric and hydrochloric acids for aqueous analysis. The solution resulting from the metals digestion was analyzed by Inductively Coupled Plasma (ICP) Emission Spectroscopy.

Analysis for Arsenic and Selenium,

One hundred- milliliter sample or one gram sample aliquots were digested with nitric and hydrogen peroxide for aqueous analysis. The resulting solutions were analyzed by graphite furnace atomic absorption (GFAA).

Analysis for Mercury

Aqueous and solid samples analyzed for mercury were oxidized with potassium permanganate. Mercury was reduced to its elemental form and aerated from solution in a closed system. Mercury was then determined with a cold vapor atomic absorption spectrophotometer.

METHOD REFERENCES

Analysis	References
Volatile Organic Compounds	Test Methods for Evaluating Solid Wastes, SW-846,
·	3rd Edition, (USEPA 1986), Method 8240A.
Semivolatile Organic Compounds	Test Methods for Evaluating Solid Wastes, SW-846,
·	3rd Edition, (USEPA 1986), Method 8270A.
Total Metals	Test Methods for Evaluating Solid Wastes, SW-846,
	3rd Edition, (USEPA 1986, updated July 1992),
	Methods 6010A, 7060, 7470, 7471, and 7740.

Attachment 2 Data Summary Tables

Soil Analy al Results Volatile Organic Compounds-Indicator Chemicals The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GI-55 GB 2	1	CI 55 GB 3	1	GI 55 GB 4	ĺ	CI 55 GI 5		GL 55 GB 7		GI 88 CIFTI	
DEPTH:		6 N		8 10'		6.8		6.8		10/12		6.8)
DATE COLLECTED:		12/16/96		12/17/96	ŀ	12/17/96	i	12/17/46		12/18/96		12/19/96	1
MATRIX:		SOIL		SOIL.		SOII	- [SOIL		SOIL		SOIL	1
MOISTURE CONTENT:	ľ	14 0	i	17 <u>0</u>		20.0		20.0		<u>21 0</u>		17.0	
ANALYTE	UNITS						ŀ				- 1		1
Acetone	μς/Кχ	/ 12	J.	1 1000		4000		14	1	• 2500	1	26	1.1
2 Butanone	μg/Кg	23	u l	6000	t:	000	u	25	t.	250	ti	24	U
Benzene	μg/Kg	5.8	t:	1500	u [360	1	¥		61	t.	ħ	t.
4 Methyl 2 pentanone	μκ/Кκ	23	t.	32000	J	11000	- 1	25	ι	680		24	ι.
Toluene	ик/Кк	5.8	u l	1500	u l	780	し	6.1	t	61	ţ.	6	t
I thythenzene	μς/Кς	5.8	u [1500	U I	780	u	61	t.	61	U	6	t
Ny lene (total)	μg/Кg	5.8	l.	1500	U	780	u	63	ι	61	L.	6	t
			ſ		J								

- J. This result should be considered a quantitative estimate.
- B. This result is qualitatively invalid since this compound was detected in a blank at similar concentration
- U. This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound
- [13] This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitive estimate.

N/A Not applicable

Soil Analy al Results Volatile Organic Compounds-Indicator Chemicals The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-SS-GB-14		GL-SS-GB-15		GL-SS-GB-15		GL-SS-GB-15		GL-SS-GB-17	
DEPTH:		4-6'		4-6'		6-8'	(8-10		2-4	}
DATE COLLECTED:	Ì	12/19/96	Į.	12/19/96		12/19/96	- {	12/19/96		12/20/96	
MATRIX:	ĺ	SOII.	- 1	SOIL.		SOIL.	-	SOII.		SOIL	
MOISTURE CONTENT:		13.0		22.0		14.0		19.0		14.0	
ANALYTE	UNITS		I								
Acetone	μg/Kg	23	υj	26	U	6500	į	28000		23	UJ
2-Butanone	μg/Kg	23	บ	26	์ บ	3800	1	3100	Ū	2.3	U
Benzene	μg/Kg	5.7	U	6.4	Ü	730	U	770	U	5.8	UJ
4-Methyl-2-pentanone	μg/Kg	23	U Ì	26	U	2900	ប	7800		23	UJ
Toluene	μg/Kg	5.7	U	6.4	U	730	U	770	Ü	5.8	UJ
Ethylbenzene	- μg/Kg	5.7	បៀ	6.4	U	730	U	770	U	5.8	UJ
Xylene (total)	μg/Kg	5.7	ប	6.4	U	730	Ü	770	U	5.8	UJ
<u> </u>											

- J This result should be considered a quantitative estimate.
- B-This result is qualitatively invalid since this compound was detected in a blank at similar concentration.
- U This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.
- UJ This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitive estimate.

N/A - Not applicable.

Aqueous Ak deal Results Volatile Organic Compounds-Indicator Chemicals The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GLW5 GB7		GLWS GB1	5	GLWS MW	3	TRIPBLANK		111.1		TRIPBLANK	
DEPTH:		N/A	j	N/A		N/A	İ	N/A		N/A		\/ /\	
DATE COLLECTED:		12/18/96		12/20/96		1/8/97	ľ	12/20/96	- 1	12/27/96		178797	
MATRIX:		WATER		WATER		AQUIOUS		TRIP BLANK		TRIP III ANK	}	TRUBLANK	1
MOISTURE CONTENT:		N/A		N/A		N/A		N/A		N/A		N/A	
ANALYTE	UNITS	· · · · · ·											
Acetone	μg/I	20	U	20	ι	480	1	20	L	20	ι.	1.1	J
2 Butanone	μg/l.	20	ւ	20	U	50	t	20	U]	20	t'	20	ιΙ
Benzene	μg/1	5	υ	5	- UJ	12	ti l	5	U	5	ι	ì	ţ.
4 Methyl 2 pentanone	μg/1	20	U	3.7	1	170	1	20	t:	20	t	20	t i
Loluene	μχ/1.	i	U (s	U)	12	U	9	U [,	ι	1	•
Ethylbenzene	μχ/1	5	U	5	UJ	12	U.	;	U	5	ι	ì	1
Xylene (total)	μg/l	5	U	5	U)	12	U	5	U	ñ	t.	i	t
													l

- 1. This result should be considered a quantitative estimate
- . B. This result is qualitatively invalid since this compound was detected in a blank at similar concentration
- U. This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound
- (ii) This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitive estimate.

N/A Not applicable

Soil Analy A Results Semivolatile Organic Compounds-Indicator Chemicals The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-SS-GB-2		GL-SS-GB-3		GL-SS-GB-4		GL-SS-GB-5		GL-SS-GB-7		GL-SS-GB-11	
DEPTH:		6-8'		8-10	ŀ	6-8'	i	6-8'	- 1	10-12'	ĺ	6-8'	1
DATE COLLECTED:		12/16/96	1	12/17/96	- 1	12/17/96	ĺ	12/17/96		12/18/96	- [12/19/96	1
MATRIX:		SOIL		SOIL	Ì	SOIL	İ	SOIL	ļ	SOIL		SOIL	Ĭ
MOISTURE CONTENT:		14.0	_	17.0	i	20.0	i	20.0	1	21.0		17.0]
ANALYTE	UNITS												
bis(2-Ethylhexyl) phthalate	μg/Kg	84	j	7900	υ	4100	υļ	410	U	420	U	57	ſ
1,2-Dichlorobenzene	μg/Kg	380	υÌ	7900	υļ	4100	υ	410	U	420	υ	400	υ
Fluoranthene	μg/Kg	380	U	7900	U	4100	υİ	410	U	420	υ	400	U
Isophorone	μg/Kg	380	U	7900	υ	4100	U	410	. n	420	U	400	υ
2-Methylnapthalene	μg/Kg	380	U	7900	. U	4100	υ	410	U	420	U	4(X)	U
2-Methylphenol	μg/Kg	380	UJ	7900	U	1000	J	· 410	U	420	U	4(X)	υ
4-Methylphenol	μg/Kg	380	υJ	7900.	υ	590	J	410	υ	420	U	400	U
Napthalene `	μg/Kg	76	J	7900	υ	4100	υ(410	U	420	U	4(X)	U
Phenot ·	μg/Kg	380	UJ	47000	}	21000]	410	U	420	U	4(X)	υ
1,2,4-Trichlorobenzene	μg/Kg	380	U	7900	U	41000	υ	410	υ	420	U	400	บ
					}		1						

- J This result should be considered a quantitative estimate.
- B This result is qualitatively invalid since this compound was detected in a blank at similar concentration.
- U This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.
- UJ This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitive estimate.

 N/Λ - Not applicable.

Soil Anal, Al Results Semivolatile Organic Compounds-Indicator Chemicals The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		CL 55 CB 14		GL 88 GB 15		GL 55 GB 15		GL 55 GB 15		GL 85 GB 17	
DEPTH:		4.6	l	4.6		6 B	- 1	8 10"		2 4	
DATE COLLECTED:		12/19/96		12/19/96		12/19/96		12/19/96		12/20/96	
MATRIX:		SOIL	[SOIL		SOIL	- 1	SOIL		પ્લા	
MOISTURE CONTENT:		13.0	1	22 ()		14 0		190		14 0	
ANALYTE	UNITS							·			
bis(2 Ethylhexyl) phthalate	µg/Кg	380	υ	420	u	3800	U	2700	υ	390	U
1,2 Dichlorobenzene	μg/Кg	380	u	420	υl	3800	u	27(0)	U	<i>390</i>	U
Fluoranthene	µ g/Кg	380	U	420	U	3800	U	2700	U	390	U
bophorone	μg/Кg	380	- u	420	U	COHF	υ	2700	U	190	U
2 Methylnapthalene	μg/Кg	380	U	420	U∫	38(X)	U	2700	U	390	U
2 Methylphenol	μg/Кg	380	u	420	U	3800	U	2700	U	390)	U
1 Methylphenol	μg/Kg	380	U	420	U	3800	U	2700	U	(90)	U
Napthalene	μg/Кg	380	U	420	U	(X)8E,	U	2700	U	<i>j</i> 9()	U
Phenol	μg/Kg	380)	U	420	υ	27(00)		16000		190	U
1,2,4 Enchlorobenzene	μg/Kg	380	U	420	U	3H(X)	U	27(X)	U	390	U
							l				

- 1. This result should be considered a quantitative estimate.
- B. This result is qualitatively invalid since this compound was detected in a blank at similar concentration
- U This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound
- UI This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitive estimate.

N/A Not applicable.

Aqueous And Ical Results Semivolatile Organic Compounds-Indicator Chemicals The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-WS-C	B-7	GL-WS-G	B-15	
DEPTH:		N/A	1	N/A		
DATE COLLECTED:		12/18/9	96	12/20/96		
MATRIX:		WATE	R	WATE	R	
MOISTURE CONTENT:		N/A		N/A		
ANALYTE	UNITS			····		
bis(2-Ethylhexyl) phthalate	μg/L	2.1	В	10	U	
1,2-Dichlorobenzene	μg/L	10	υ	10	U	
Fluoranthene	μg/L	10	υ	10	υ	
Isophorone	μg/L	10	U	10	υ	
2-Methylnapthalene	μg/L	10	υ	10	U	
2-Methylphenol	μg/L	10	υ	10	U	
4-Methylphenol	μg/L	10	υ	10	U	
Napthalene	μg/L	10	U	10	υ	
Phenol	μg/L	10	υ	10	υ	
1,2,4-Trichlorobenzene	μg/L	10	υ	10	υ	

- J This result should be considered a quantitative estimate.
- B This result is qualitatively invalid since this compound was detected in a blank at similar concentration.
- U This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.
- UJ This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitive estimate.

 N/Λ - Not applicable.

Soil Anal₅ Al Results Total Metals-Indicator Chemicals The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION		GL-SS-GB-1	-	GL:55:GB:4	T	GL-85-GB-6	Ī	GL:55:GB:8	· · · · · · · · ·	Cd. 55 CB-10	
DEPTH		4-6'		6-8'	ŀ	2-4'		2-4'		6-8	
DATE COLLECTED:		12/16/96		12/17/96		12/17/96		12/18/96		12/18/96	
MOSITURE CONTENT:		15		20		31.0		18.0	ì	17.0	
MATRIX:		SOIL		SOIL		SOIL		SOIL		SOIL.	
ANAYTE	UNITS										
Antimony	mg/kg	1.2	UJ	12	UJ	1.5	υj	1.2	υJ	1.2	UJ
Arsenic	mg/kg	2.6	j	4.9	J	9 ()	J	2.3	J	8.2	J
Beryllium	mg/kg	0.59	U	0.62	U	0.73	u l	0.61	U	0.61	U
Cadmum	mg/kg	0.23	U	0.25	U	0.29	U	0.24	U	0.27	
Chromium	mg/kg	5.2		17.4		10.9		12 1		12.5	
Copper	mg/kg	88	i	27 1		11.1		6.2		24.9	
l cad	mg/kg	5.0	J.	12.3	j j	13.5	J.	6.5	1	13.5	J
Mercury	mg/kg	0.12	U	0.12	υ	0.15	U	0.12	U	0.12	U
Nicket	mg/kg	11.6	ĺ	33.0		17.3		14-1		29.0	
Selemum	mg/kg	0.59	- UJ	0.62	UJ	0.73	UJ	0,61	UJ	0.63	U
Silver	mg/kg	0.59	U	0.62	υ	0.73	U	0.61	U	0.61	1.)
Lhallium	mg/kg	1.2	U	1.2	U	1.5	U	1.2	U	1.2	(J
Zinc	mg/kg	28.2		81.3		63.1		54.4		74.6	

B - This result is qualitatively invalid since this compound/analyte was detected in a blank at a similar concentration.

N/A - Not applicable.

U - This compound/analyte was analyzed but not detected. The numerical value represents the quantitation/detection limit of the compound/analyte.

UJ - This compound/analyte was analyzed but not detected. The numerical value that represents the quantitation limit of the compound/analyte is a quantitive estimate.

Soil Analy A Results Total Metals-Indicator Chemicals The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-SS-GB-12	1	GL-SS-GB-13		GL-SS-GB-15	•
DEITH:		8-10'	1	4-6'	İ	4-6'	
DATE COLLECTED:		12/19/96]	12/19/96		12/19/96	
MOSITURE CONTENT	`:	22.0	- [18.0		17.0	
MATRIX:		SOIL	ł	SOIL		SOIL	
ANAYTE	UNITS						
Antimony	mg/kg	1.3	UJ (1.2	UJ	1.2	UJ
Arsenic	mg/kg	9.1	J.	1.5	J	5.0	J
Beryllium	mg/kg	0.64	υ	0.61	U	0.60	U
Cadmium	mg/kg	0.26	U	0.24	U	0.24	U
Chromium	mg/kg	14.1	l	4.0	1	8.4	
Copper	mg/kg	27.3	1	7.3		15.4	
Lead	mg/kg	13.1	3	4.1	,	8.6	J
Mercury	mg/kg	0.13	U	0.12	υ	0.12	U
Nickel	mg/kg	33.3		7.3	ļ	17.3	
Selenium	mg/kg	0.64	υj	0.61	UJ (1.2	UJ
Silver	mg/kg	0.64	υ	0.61	υ	0.60	U
Thallium	mg/kg	1.3	U	1.2	ប	1.2	U
Zinc	mg/kg	80.7	- {	27.1		50.6	

- B This result is qualitatively invalid since this compound/analyte was detected in a blank at a similar concentration.
- U This compound/analyte was analyzed but not detected. The numerical value represents the quantitation/detection limit of the compound/analyte.
- UJ This compound/analyte was analyzed but not detected. The numerical value that represents the quantitation of the compound/analyte is a quantitive estimate.
- N/A Not applicable.

SAMPLE LOCATION		GL-WS-GB-1		GL-W5-GB-3		GL WS GB-4		GL/WS/GB 7	and the s
DEPTIL		N/A		N/A	ŀ	N/A		N/A	
DATE COLLECTED.		12/16/96		12/17/96	İ	12/17/96		12/18/96	
MOSITURE CONTEN	rr.	N/A		N/A		N/A		N/A	
MATRIX.		WATER		WATER	i	WATER		WATER	
ANAYTE	UNITS								
Antimony	mg/L	0.010	υ	0.010	U	0.010	U	0.010	U
Arsenic	mg/L	0.010	IJ	0.041	1	0.018	J [0.010	UJ
Beryllium	mg/L	0.0050	υ	0.0050	U	0.0050	U	0.0050	U
Cadmium	mg/L	0.0020	u	0.0022	İ	0.0055		0.0020	U
Chromium	mg/1.	0.020		0.057		0.089		0.028	
Cobalt	mg/l.	0.050	υ	0.050	U	0.050	U	0.050	U
Copper	mg/L	0.029		0.076		0.11		0.032	
Lead	mg/1.	0.025		0.036		0.14		0.015	
Mercury	mg/L	0,00020	UJ	0.00020	UJ	0.00056	1	0.00020	UJ
Nickel	mg/l	0.040	U	0.11		0.12	ŀ	0.040	U
Selenium	mg/l	0.0050	UJ	0.010	UJ	0.020	υj	0.010	[1]
Silver	mg/l	0.0020	U	0.0050	U	0.0050	U	0.005	£1
Thallium	mg/1.	0.010	U	0.010	U	0.010	U	0.010	U
Zinc	mg/L	0,098		0.32	1	0.72		0.13	

B - This result is qualitatively invalid since this compound/analyte was detected in a blank at a similar concentration.

- U This compound/analyte was analyzed but not detected. The numerical value represents the quantitation/detection limit of the compound/analyte.
- UJ This compound/analyte was analyzed but not detected. The numerical value that represents the quantitation of the compound/analyte is a quantitive estimate.

N/A - Not applicable.

Aqueous Ark vical Results Total Metals-Indicator Chemicals The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-WS-GB-9	T	GL-WS-GB-11		GL-WS-GB-13	
DEITH:		N/A	ì	N/A		N/A	
DATE COLLECTED:		12/18/96	j	12/19/96		12/19/96	
MOSITURE CONTENT:		N/A	i	N/A	{	N/A	
MATRIX:		WATER		WATER	Ì	WATER	
ANAYTE	UNITS						
Antimony	mg/L	0.010	υ	0.010	υĺ	0.010	U
Arsenic	mg/L	0.011	J	0.011	3	0.010	UJ
Beryllium	mg/L	0.0093		0.014		0.0050	U
Cadmium	mg/L	0.0086	İ	0.020	ŀ	0.0020	U
Chromium	mg/L	0.27	ł	0.44	ì	0.070	
Cobalt	mg/L	0.22		0.35		0.050	U
Copper	mg/L	0.34	İ	0.74		0.11	
Lead	mg/L	0.18	Ì	0.36	ì	0.052	
Mercury	mg/L	0.00045	J	0.00081	J J	0.00020	UJ
Nickel	mg/L	0.48	ļ	0.86	l	0.14	
Selenium	mg/L	0.040	U)	0.080	UJ	0.020	UJ
Silver	mg/L	0.0050	υ	0.0050	υ	0.0050	U
Thallium	mg/L	0.010	υl	0.020	U	0.010	U
Zinc	mg/L	1.5	i	2.8	1	0.42	

B-This result is qualitatively invalid since this compound/analyte was detected in a blank at a similar concentration.

N/A - Not applicable.

U - This compound/analyte was analyzed but not detected. The numerical value represents the quantitation/detection limit of the compound/analyte.

UJ - This compound/analyte was analyzed but not detected. The numerical value that represents the quantitation of the compound/analyte is a quantitive estimate.

ERM-FAST VOC Data

SAMPLE NO.

Lab Name: ERM-FAST Contract: LUBRIZOL Project No.: 09928.00.01 Site: GRINR'S LA Location: FREMONT, OHIO Group: Matrix: (soil/water) SOIL Lab Sample ID: GB1 4-6' Sample wt/vol: 5.0 (g/mL) G Lab File ID: LUBV006.D Level: (low/med) LOW Date Received: 12/16/96	
Matrix: (soil/water) SOIL Lab Sample ID: GB1 4-6' Sample wt/vol: 5.0 (g/mL) G Lab File ID: LUBV006.D	
Sample wt/vol: 5.0 (g/mL) G Lab File ID: LUBV006.D	
Level: (low/med) LOW Date Received: 12/16/96	
% Moisture: not dec. 0 Date Analyzed: 12/17/96	
GC Column: DB-5 ID: 0.25 (mm) Dilution Factor: 1.0	
Soil Extract Volume: (uL) Soil Aliquot Volume:	(uL)
Concentration Units:	
CAS No. Compound (ug/L or ug/Kg) ug/Kg Q	
67-64-1 acetone 33 JB	
78-93-3 2-butanone 50 U	
71-43-2 benzene 50 U	
108-10-1 4-methyl-2-pentanone 50 U	
108-88-3 toluene 50 U	
100-41-4 ethylbenzene 50 U	
108-38-3 m,p-xylene 100 U	
95-47-6 o-xylene 50 U	

SAMPLE NO.

GL-SS-GB-1 0-2'

Lab Name:	ERM-FAST				Contract:	LUBRIZOL	<u></u>	
Project No.:	09928.00.0	1	Site:	GRINR'S LA	Location:	FREMONT, OHIO	Group:	
Matnx: (soil/	(water)	SOIL	_			Lab Sample ID:	GB1 0-2'	
Sample wt/vo	ol:	4.8	(g mL)	G		Lab File ID:	LUBV004.D	
Level: (low	vimed)	LOW	-			Date Received:	12/16/96	
% Moisture:	not dec.	0	_			Date Analyzed:	12/16/96	
GC Column:	DB-5		ID:	0.25	mm)	Dilution Factor:	1.0	•
Soil Extract V	/olume:		(uL)			Soil Aliquot Volume:		(uL)
					Concentrati	ion Units:		
CA	S No.	Compound		•	(ug/L or ug/K	g) <u>ug/Kg</u>	Q	
67	64.1	acetone			7	52	11	ì

		Concentration Uni	ts:		
CAS No.	Compound	(ug/L or ug/Kg)	ug/Kg_	Q	
67-64-1	acetone		52	U	
78-93-3	2-butanone		52	U	
71-43-2	benzene		52	U	
108-10-1	4-methyl-2-pentanone		52	U	
108-88-3	toluene		52	U	
100-41-4	ethylbenzene		52	U	
108-38-3	m,p-xylene	1	00	U	
95-47-6	o-xylene		52	U	
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SAMPLE NO.

GL-WS-GB-1

Lab Name:	ERM-FAST	·			Contract:	LUBRIZOL	GE-W3	
Project No.:	09928.00.01		Site:	GRINR'S LA	Location:	FREMONT, OHIO	Group: _	
Matrix: (soil/	water) _	WATER	-			Lab Sample ID:	WS-GB-1	
Sample wt/vo	d:	5.0	(g/mL)	ML		Lab File ID:	LUBV003.D	
Level: (low	/med)					Date Received:	12/16/96	
% Moisture:	not dec.	0	-			Date Analyzed:	12/16/96	
GC Column:	DB-5		ID:	0.25(m	ım)	Dilution Factor:	1.0	
Soil Extract V	olume:		(uL)			Soil Aliquot Volume:		(uL)

Concentration Units

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/L	a
67-64-1	acetone	110	В
78-93-3	2-butanone	50	U
71-43-2	benzene	50	U
108-10-1	4-methyl-2-pentanone	50	U
108-88-3	toluene	50	U
100-41-4	ethylbenzene	50	U
108-38-3	m,p-xylene	100	U
95-47-6	o-xylene	50	U
			
			
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SAMPLE NO.

Date Analyzed: 12/17/96

Lab Name: ERM-FAST

% Moisture: not dec.

0

Contract: LUBRIZOL

GL-SS-GB-1 2-4'

 Project No.:
 09928.00.01
 Site: GRINR'S LA Location:
 FREMONT, OHIO
 Group:

 Matrix:
 (soil/water)
 SOIL
 Lab Sample ID: GB1 2-4'

 Sample wt/vol:
 4.8 (g·mL) G
 Lab File ID: LUBV005.D

 Level:
 (low/med)
 LOW

Date Received: 12/16/96

GC Column: DB-5 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units:

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg)ug/Kg	Q
67-64-1	acetone	52_	Ú
78-93-3	2-butanone	52	U
71-43-2	benzene	52	U
108-10-1	4-methyl-2-pentanone	52	U
108-88-3	toluene	52	Ü
100-41-4	ethylbenzene	52	υ
108-38-3	m,p-xylene	100	U
95-47-6	o-xylene	52	U
	<u> </u>		
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SAMPLE NO

GL-SS-GB-1 6-8'

Lab Name: ERM-FAST			Contract:	LUBRIZOL	GL-55-GB-1 0-0
Project No.: 09928.00.	<u>0</u> 1	Site: GRINR'S LA	Location:	FREMONT, OHIO	Group:
Matrix: (soil/water)	SOIL			Lab Sample ID:	GB1 6-8'
Sample wt/vol:	4.8(g/r	nL) <u>G</u>		Lab File ID:	LUBV007.D
Level: (low/med)	LOW			Date Received:	12/16/96
% Moisture: not dec.	0			Date Analyzed:	12/17/96
GC Column: DB-5		ID: <u>0.25</u> (r	nm)	Dilution Factor:	1.0
Soil Extract Volume:	(uL			Soil Aliquot Volume:	(uL)

Concentration Units:

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	_
67-64-1	acetone	28	JB
78-93-3	2-butanone	52	U
71-43-2	benzene	33	J
108-10-1	4-methyl-2-pentanone	52	Ū
108-88-3	toluene	52	Ü
100-41-4	ethylbenzene	52	U
108-38-3	m,p-xylene	100	U
95-47-6	o-xylene	52	U
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FORM I VOA

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SAMPLE NO.

GL-SS-GB-1 8-10'

Lab Name:	ERM-FAST	-			_ Contract:	LUBRIZOL	
Project No.:	09928.00.01		Site:	GRINR'S	LA Location:	FREMONT, OHIO	Group:
Matrix: (soil/	water) _	SOIL	-			Lab Sample ID:	GB18-10'
Sample wt/vo	d:	4.7	(g·mL)	<u> </u>	_	Lab File ID:	LUBV008.D
Level: (low	/med)	LOW	_			Date Received:	12/16/96
% Moisture:	not dec.	0	-			Date Analyzed:	12/17/96
GC Column:	DB-5		_ ID:	0 25	_ (mm)	Dilution Factor:	1.0
Soil Extract V	olume:		(uL)			Soil Aliquot Volume:	(uL)

Concentration Units:

		Concentration Units:						
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	Q					
67-64-1	acetone	21000	В					
78-93-3	2-butanone	920						
71-43-2	benzene	53	U					
108-10-1	4-methyl-2-pentanone	5300						
108-88-3	toluene	53	U					
100-41-4	ethylbenzene	53	U					
108-38-3	m,p-xylene	110	U					
95-47-6	o-xylene	53	U					
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SAMPLE NO

GL-SS-GB-2 0-2"

Lab Name: ERM-FAST			Contract:	LUBRIZOL	GL-55-GB-2 0-2
Project No.: 09928.00.0	1	Site: GRINR'S LA	Location:	FREMONT, OHIO	Group:
Matrix: (soil/water)	SOIL	_		Lab Sample ID:	GB2 0-2'
Sample wt/vol:	4.7	_(g/mL)G		Lab File ID:	LUBV010.D
Level: (low/med)	LOW	· -		Date Received:	12/16/96
% Moisture: not dec.	0	_		Date Analyzed:	12/17/96
GC Column: DB-5		ID: 0.25 (m	ım)	Dilution Factor:	1.0
Soil Extract Volume:		_(uL)		Soil Aliquot Volume:	(uL)

Concentration Units:

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	Q
67-64-1	acetone	53	U _
78-93-3	2-butanone	53	U
71-43-2	benzene	53	U
108-10-1	4-methyl-2-pentanone	53	U
108-88-3	toluene	53	U
100-41-4	ethylbenzene	53	U
108-38-3	m,p-xylene	110	U
95-47-6	o-xylene	53	U
	•		

FORM I VOA

SAMPLE NO.

GL-SS-GB-2 2-4' ERM-FAST Contract: LUBRIZOL Lab Name: Site: GRINR'S LA Location: FREMONT, OHIO Project No.: 09928.00.01 Group: SOIL Matrix: (soil/water) Lab Sample ID: GB2 2-4' (g mL) G Sample wt/vol: 4.6 Lab File ID: LUBV011.D LOW Level: (low/med) Date Received: 12/16/96 0 Date Analyzed: 12/17/96 % Moisture: not dec. Dilution Factor: 1.0 GC Column: DB-5 ID: 0.25 (mm) Soil Aliquot Volume: (uL) Soil Extract Volume: (uL)

Concentration Units:

		Concentration Offics:	
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	<u> </u>
67-64-1	acetone	54	U
78-93-3	2-butanone	54	U
71-43-2	benzene	54	U
108-10-1	4-methyl-2-pentanone	54	U
108-88-3	toluene	54	U
100-41-4	ethylbenzene	54	U
108-38-3	m,p-xylene	110	U
95-47-6	o-xylene	54	U
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SAMPLE NO.

Lab Name: ERM-FAST Contract: LUBRIZOL

Project No.: 09928.00.01 Site: GRINR'S LA Location: FREMONT, OHIO Group:

Matrix: (soil/water) SOIL Lab Sample ID: GB2 4-6'
Sample wt/vol: 4.8 (g/mL) G Lab File ID: LUBV013.D

 Sample wt/vol:
 4.8 (g/mL)
 G
 Lab File ID: LUBV013.D

 Level:
 (low/med)
 LOW
 Date Received: 12/16/96

% Moisture: not dec. 0 Date Analyzed: 12/17/96

GC Column: DB-5 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units:

CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	Q
67-64-1	acetone	81	В
78-93-3	2-butanone	52	U
71-43-2	benzene	52	U
108-10-1	4-methyl-2-pentanone	. 52	U
108-88-3	toluene	52	U
100-41-4	ethylbenzene	52	U
108-38-3	m,p-xylene	100	U
95-47-6	o-xylene	52	U

SAMPLE NO.

GL-SS-GB-2 6-8' RE

(uL)

Lab Name: **ERM-FAST** Contract: LUBRIZOL Project No.: 09928.00.01 Site: GRINR'S LA Location: FREMONT, OHIO Group: SOIL Matrix: (soil/water) Lab Sample ID: GB26-8RE Sample wt/vol: 4.5 Lab File ID: LUBV033.D (g.mL) G Date Received: 12/17/96 Level: (low-med) LOW % Moisture: not dec. 0 Date Analyzed: 12/18/96 Dilution Factor: 1.0 GC Column: DB-5 ID: 0 25 (mm)

(uL)

Soil Extract Volume:

Concentration Units:

Soil Aliquot Volume: _____

		Concentration Units:					
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	a				
67-64-1	acetone	1800					
78-93-3	2-butanone	56	Ü				
71-43-2	benzene	56	U				
108-10-1	4-methyl-2-pentanone	240					
108-88-3	toluene	56	U				
100-41-4	ethylbenzene	56	U				
108-38-3	m,p-xylene	110	U				
95-47-6	o-xylene	56	U				
 							
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							GL-SS-GB-2 8-10
Lab Name:	ERM-FAST				Contract:	LUBRIZOL	
Project No.:	09928.00.01		Site:	GRINR'S LA	Location:	FREMONT, OHIO	Group:
Matrix: (soil/	water)	SOIL	_			Lab Sample ID:	GB28-10'
Sample wt/vo	ol:	4.7	(g/mL)	G		Lab File ID:	LUBVO15.D
Level: (low	r/med)	LOW	-			Date Received:	12/16/96
% Moisture:	not dec.	0	-			Date Analyzed:	12/17/96
GC Column:	DB-5		_ ID:	0.25(m	nm)	Dilution Factor:	1.0
Soil Extract V	olume:		_ (uL)			Soil Aliquot Volume:	(uL)
					C	ina I Inita	

Concentration Units:

		Concentration Units:						
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	Q					
67-64-1	acetone	380	В					
78-93-3	2-butanone	34	J					
71-43-2	benzene	53	U					
108-10-1	4-methyl-2-pentanone	1000						
108-88-3	toluene	53	U					
100-41-4	ethylbenzene	53	U					
108-38-3	m,p-xylene	110	U					
95-47-6	o-xylene	53	U					
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SAMPLE NO.

GL-WS-GB-2 Lab Name: ERM-FAST Contract: LUBRIZOL Site: GRINR'S LA Location: FREMONT, OHIO Group: Project No.: 09928.00.01

Lab Sample ID: WS-GB-2 Matrix: (soil/water) 5.0 _ (g/mL) _ ML Lab File ID: LUBV012.D Sample wt/vol: Date Received: 12/16/96 Level: (low/med)

0 % Moisture: not dec. Date Analyzed: 12/17/96

WATER

Dilution Factor: 1.0 GC Column: DB-5 ID: 0.25 (mm)

Soil Aliquot Volume: (uL) ____ (uL) Soil Extract Volume:

CAS No.	Compound	(ug/L or ug/Kg)	ug/L	Q
67-64-1	acetone		39	JB
78-93-3	2-butanone		50	U
71-43-2	benzene		50	U
108-10-1	4-methyl-2-pentanone		50	υ
108-88-3	toluene		50	U
100-41-4	ethylbenzene		50	U
108-38-3	m,p-xylene	1	00	U
95-47-6	o-xylene		50	U
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SAMPLE NO

Lab Name: ERM-FAS	Γ	Contract:	LUBRIZOL	GL-SS-GB-3 0-2
Project No.: 09928.00	.01 Site: GRINR'S LA	Location:	FREMONT, OHIO	Group:
Matrix: (soil/water)	SOIL		Lab Sample ID:	GB3 0-2'
Sample wt/vol:	4.7 (g/mL) G		Lab File ID:	LUBV020.D
Level: (low/med)	LOW		Date Received:	12/17/96
% Moisture: not dec.	0		Date Analyzed:	12/17/96
GC Column: DB-5	ID: 0.25 (mm)	Dilution Factor:	1.0
Soil Extract Volume:	(uL)		Soil Aliquot Volume:	(uL)

	s:			
CAS No.	Compound	(ug/L or ug/Kg)	ug/Kg	Q
67-64-1	acetone	5	3	U
78-93-3	2-butanone	5	3	Ū
71-43-2	benzene	5	3	U
108-10-1	4-methyl-2-pentanone	5	3	U
108-88-3	toluene	5	3	Ú
100-41-4	ethylbenzene	5	3	U
108-38-3	m,p-xylene	11	0	Ú
95-47-6	o-xylene	5	3	Ü
				
				
				
				
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GL-SS-GB-3 2-4

Lab Name: <u>ERM-F</u>	AST		Contract:	LUBRIZOL		
Project No.: 09928	.00.01	Site: GRINR'S LA	A Location:	FREMONT, OHIO	Group: _	
Matrix: (soil/water)	SOIL	_		Lab Sample ID:	GB3 2-4'	
Sample wt/vol:	4.8	(g·mL) G		Lab File ID:	LUBV021.D	
Level: (low/med)	LOW	_		Date Received:	12/17/96	
% Moisture: not dec	0	_		Date Analyzed:	12/17/96	
GC Column: DB-5	<u>-</u> -	ID: 0.25	(mm)	Dilution Factor:	1.0	
Soil Extract Volume:		_(uL)		Soil Aliquot Volume:		(uL)

Concentration Units:	Conc	entrati	on U	nits:
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		Concentration Units:				
CAS No.	Compound	(ug/L or ug/Kg)	ug/Kg Q			
67-64-1	acetone	52	U			
78-93-3	2-butanone	52	U			
71-43-2	benzene	52	U			
108-10-1	4-methyl-2-pentanone	52	U			
108-88-3	toluene	52	U			
100-41-4	ethylbenzene	52	U			
108-38-3	m,p-xylene	100	U			
95-47-6	o-xylene	52	U			
						
						
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SAMPLE NO

IL-SS-GB-3 4-6'

Lab Name: ERM-FAST			Contract:	LUBRIZOL	GL-33-GD-3 4-0
Project No.: 09928.00.0	1	Site: GRINR'S LA	Location:	FREMONT, OHIO	Group:
Matrix: (soil/water)	SOIL			Lab Sample ID:	GB3 4-6'
Sample wt/vol:	5.3	(g/mL) G		Lab File ID:	LUBV022.D
Level: (low/med)	LOW			Date Received:	12/17/96
% Moisture: not dec.	0			Date Analyzed:	12/17/96
GC Column: DB-5		ID: <u>0.25</u> (m	ım)	Dilution Factor:	1.0
Sail Extract Volume:		/ul \		Soil Aliquot Volume:	/ul \

	•	Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	Q
67-64-1	acetone	47	Ū
78-93-3	2-butanone	47	U
71-43-2	benzene	47	U
108-10-1	4-methyl-2-pentanone	47	υ
108-88-3	toluene	47	U
100-41-4	ethylbenzene	47	U
108-38-3	m,p-xylene	94	U
95-47-6	o-xylene	47	Ü
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SAMPLE NO.

GL-SS-GB-3 6-8'

Lab Name:	ERM-FAST				Contract:	LUBRIZOL		
Project No.:	09928.00.01		Site:	GRINR'S L	A Location:	FREMONT, OHIO	Group:	
Matrix: (soil/	water)	SOIL	_			Lab Sample ID	: GB3 6-8'	
Sample wt/vo	d: _	4.8	_(g mL)	G		Lab File ID	: <u>LUBV025.D</u>	
Level: (low	//med)	LOW	_			Date Received	: 12/17/96	
% Moisture:	not dec.	0	_			Date Analyzed	: 12/17/96	
GC Column:	DB-5		ID:	0.25	(mm)	Dilution Factor	:1.0	
Soil Extract V	olume:		(uL)			Soil Aliquot Volume	:	(uL)

Concentration Units:

	Concentration Units:								
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	α						
67-64-1	acetone	1700							
78-93-3	2-butanone	52	U						
71-43-2	benzene	52	U						
108-10-1	4-methyl-2-pentanone	1100							
108-88-3	toluene	52	U						
100-41-4	ethylbenzene	52	U						
108-38-3	m,p-xylene	100	U						
95-47-6	o-xylene	52	U						
									

SAMPLE NO

I -SS-GR-3 8-10' RF

Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GE-55-GD-5	0-10 IIL
Project No.:	09928.00.01		Site:	GRINR'S LA	Location:	FREMONT, OHIO	Group:	
Matrix: (soil/	water)	SOIL	_			Lab Sample ID:	8-10'RE	
Sample wt/vo	of:	4.7	(g/mL)	G		Lab File ID:	LUBV043.D	
Level: (low	//med)	LOW	-			Date Received:	12/18/96	
% Moisture:	not dec.	0				Date Analyzed:	12/18/96	
GC Column:	DB-5		ID:	0.25	mm)	Dilution Factor:	1.0	
Soil Extract V	olume:		(uL)			Soil Aliquot Volume:		(uL)

		Concentration Units:					
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	a				
67-64-1	acetone	4000	T				
78-93-3	2-butanone	61					
71-43-2	benzene	53	U				
108-10-1	4-methyl-2-pentanone	3400					
108-88-3	toluene	53	U				
100-41-4	ethylbenzene	53	U				
108-38-3	m,p-xylene	110	U				
95-47-6	o-xylene	53	U				
							
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SAMPLE NO.

SI -SS-GR-3 10-12

Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GL-93-GB-3 10-12
Project No.:	09928.00.01		Site:	GRINR'S LA	Location:	FREMONT, OHIO	Group:
Matrix: (soil/	water)	SOIL	_			Lab Sample ID:	GB310-12
Sample wt/vo	sk:	4.9	_(g:mL)	G		Lab File ID:	LUBV027.D
Level: (low	r/med)	LOW	_			Date Received:	12/17/96
% Moisture:	not dec.	0	_			Date Analyzed:	12/17/96
GC Column:	DB-5		_ ID:	0.25(n	nm)	Dilution Factor:	1.0
Soil Extract V	olume:		_ (uL)			Soil Aliquot Volume:	(uL)

CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	a
67-64-1	acetone	18000	
78-93-3	2-butanone	240	
71-43-2	benzene	51	U
108-10-1	4-methyl-2-pentanone	140	
108-88-3	toluene	51	U
100-41-4	ethylbenzene	51	U
108-38-3	m,p-xylene	100	U
95-47-6	o-xylene	51	U
			
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Lab Name: E	RM-FAST				Contract:	LUBRIZOL	GF-M2-GR-3
Project No.: 0	9928.00.01		Site:	GRINR'S L	A Location:	FREMONT, OHIO	Group:
Matrix: (soil/wa	ater) _	WATER	_			Lab Sample ID:	WS-GB-3
Sample wt/vol:	_	5.0	(g/mL)	ML		Lab File ID:	LUBV019.D
Level: (low/m	ned)		-			Date Received:	12/17/96
% Moisture: no	ot dec.	0	_			Date Analyzed:	12/17/96
GC Column: D)B-5		ID:	0.25	(mm)	Dilution Factor:	1.0
Soil Extract Volu	ume:		(uL)			Soil Aliquot Volume:	(uL)

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/L	Q
67-64-1	acetone	50	U
78-93-3	2-butanone	50	U
71-43-2	benzene	50	U
108-10-1	4-methyl-2-pentanone	50	U
108-88-3	toluene	50	U
100-41-4	ethylbenzene	50	U
108-38-3	m,p-xylene	100	U
95-47-6	o-xylene	50	U
			
 			

SAMPLE NO.

Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GL-SS-GE	3-4 0-2'
Project No.:	09928.00.0	1	Site:	GRINR'S L	A Location:	FREMONT, OHIO	Group:	
Matrix: (soi	l/water)	SOIL	_			Lab Sample ID:	GB40-2RE	
Sample wt/v	vol:	4.7	(g mL)	G		Lab File ID:	LUBV044.D	
Level: (lo	w∉med)	LOW				Date Received:	12/18/96	
% Moisture:	not dec.	0				Date Analyzed:	12/18/96	•
GC Column:	DB-5		ID:	0.25	(mm)	Dilution Factor:	1.0	
Soil Extract	Volume:		(uL)			Soil Aliquot Volume:		(uL)
					Concentrat	ion Units:		
CA	AS No.	Compound			(ug/L or ug/K	g) <u>ug/Kg</u>	Q	
67	7-64-1	acetone			T	29	J	1
78	-93-3	2-butanone				53	U	

CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	_ Q
67-64-1	acetone	29	J
78-93-3	2-butanone	53	U
71-43-2	benzene	53	U
108-10-1	4-methyl-2-pentanone	53	U
108-88-3	toluene	53	U
100-41-4	ethylbenzene	53	U
108-38-3	m,p-xylene	110	Ü
95-47-6	o-xylene	53	U
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SAMPLE NO.

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	VOLATILE ORGANICS ANALYSIS DATA SHEET					GL-SS-GB-4 2-4'	
Lab Name:	ERM-FAST			Contract:	LUBRIZOL	GL-55-0	ID-4 2-4
Project No.:	09928.00.0	1	Site: GRINR'S LA	Location:	FREMONT, OHIO	Group:	
Matrix: (soil/	water)	SOIL			Lab Sample ID:	GB4 2-4'	
Sample wt/vo	ol:	4.6(g/r	nL) <u>G</u>		Lab File ID:	LUBV030.D	
Level: (low	r/med)	LOW			Date Received:	12/17/96	
% Moisture:	not dec.	0			Date Analyzed:	12/18/96	
GC Column:	DB-5		ID: <u>0.25</u> (n	nm)	Dilution Factor:	1.0	
Soil Extract V	'olume:	(uL) ·		Soil Aliquot Volume:		(uL)
				Concentrat	ion Units:		
CAS	S No.	Compound	(1	ug/L or ug/K	g) <u>ug/Kg</u>	Q	
67-6	64-1	acetone			54	U	
78-9	93-3	2-butanone			54	U	
71-4	43-2	benzene			54	U	
108	1-10-1	4-methyl-2-pent	anone		54	U	
	-88-3	toluene			54	U	
100)-41-4	ethylbenzene			54	U	
108	-38-3	m,p-xylene			110	U	

54

o-xylene

95-47-6

SAMPLE NO.

							GL-SS-C	3B-4 4-6
Lab Name:	ERM-FAST				Contract:	LUBRIZOL		
Project No.:	09928.00.0	21	Site: (GRINR'S LA	Location:	FREMONT, OHIO	Group:	
Matrix: (soi	il/water)	SOIL	_			Lab Sample ID:	GB4 4-6'	
Sample with	vol:	4.7	(g·mL)	G		Lab File ID:	LUBV031.D	
Level: (lo	w/med)	LOW				Date Received:	12/17/96	
% Moisture:	: not dec.	o				Date Analyzed:	12/18/96	
GC Column:	DB-5		ID:	0.25 (n	nm)	Dilution Factor:	1.0	
Soil Extract	Volume:		(uL)			Soil Aliquot Volume	:	(uL)
					Concentrat	tion Units:		
C	AS No.	Compound		(1	ug/L or ug/K	g) <u>ug/Kg</u>	Q	
67	7-64-1	acetone				53	U	
78	3-93-3	2-butanone				53	U	
71	1-43-2	benzene				53	U	
10	08-10-1	4-methyl-2-	pentanone	:	1	53	U	
10	08-88-3	toluene				53	U	
10	00-41-4	ethylbenzer	ne			53	U	
10	08-38-3	m,p-xylene				110	U	
95	5-47-6	o-xylene				53	U	
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SAMPLE NO.

Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GL-SS-G	B-4 6-8'
Project No.:	09928.00.0	1	Site:	GRINR'S LA	A Location:	FREMONT, OHIO	Group:	
Matrix: (soil/	water)	SOIL	_			Lab Sample ID:	GB4 6-8'	
Sample wt/vo	ol:	4.7	_{g/mL)	G		Lab File ID:	LUBV032.D	
Level: (low	r/med)	LOW	-			Date Received:	12/17/96	
% Moisture:	not dec.	0	_			Date Analyzed:	12/18/96	
GC Column:	DB-5		ID:	0.25	(mm)	Dilution Factor:	1.0	
Soil Extract V	olume:		_(uL)			Soil Aliquot Volume:		(uL)
CAS	2 No	Compound			Concentrat		0	

CAS No.	Compound	(ug/L or ug/Kg)	ug/Kg	Q
67-64-1	acetone	130	00 1	
78-93-3	2-butanone		3	U
71-43-2	benzene		3	U
108-10-1	4-methyl-2-pentanone	11		
108-88-3	toluene		3	U
100-41-4	ethylbenzene		3	U
108-38-3	m,p-xylene	11		U
95-47-6	o-xylene		3	U
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SAMPLE NO.

Date Received: 12/17/96

 % Moisture:
 not dec.
 0
 Date Analyzed: 12/18/96

 GC Column:
 DB-5
 ID: 0.25 (mm)
 Dilution Factor: 1.0

Level: (low/med)

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/	<u>ı </u>
67-64-1	acetone	75	
78-93-3	2-butanone	50	U
71-43-2	benzene	50	U
108-10-1	4-methyl-2-pentanone	50	U
108-88-3	toluene	50	U
100-41-4	ethylbenzene	50	U
108-38-3	m,p-xylene	100	U
95-47-6	o-xylene	50	U
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SAMPLE NO

GL-SS-GB-5 0-2"

Lab Name: ERM-FAST			Contract:	LUBRIZOL	GE-33-GD-3 0 2
Project No.: 09928.00.01)	Site: GRINR'S LA	Location:	FREMONT, OHIO	Group:
Matrix: (soil/water)	SOIL	<u>.</u>		Lab Sample ID:	GB5 0-2'
Sample wt/vol:	4.7	(g/mL) G		Lab File ID:	LUBV035.D
Level: (low/med)	LOW	_		Date Received:	12/17/96
% Moisture: not dec.	0	_		Date Analyzed:	12/18/96
GC Column: DB-5		ID: <u>0.25</u> (m	m)	Dilution Factor:	1.0
Soil Extract Volume:		_(uL)		Soil Aliquot Volume:	(uL)

CAS No.	Compound	Concentration Units: (ug/L or ug/Kg) ug/Kg	Q
67-64-1	acetone	53	TUT
78-93-3	2-butanone	53	
71-43-2	benzene	53	
108-10-1	4-methyl-2-pentanone	53	
108-88-3	toluene	53	
100-66-3		53	1 0
108-38-3	ethylbenzene	110	1 0
	m,p-xylene		
95-47-6	o-xylene	53	U
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SAMPLE NO.

GL-SS-GB-5 2-4'

Lab Name: ERM-FAST		c	ontract:	LUBRIZOL		
Project No.: 09928.00.0	<u>)</u> 1 s	ite: GRINR'S LA L	ocation:	FREMONT, OHIO	Group:	
Matrix: (soil/water)	SOIL			Lab Sample ID:	GB5 2-4'	
Sample wt/vol:	4.6(g/m	L) <u>G</u>		Lab File ID:	LUBV036.D	
Level: (low/med)	LOW			Date Received:	12/17/96	
% Moisture: not dec.	<u> </u>			Date Analyzed:	12/18/96	
GC Column: DB-5		ID: <u>0.25</u> (mm))	Dilution Factor:	1.0	
Soil Extract Volume:	(uL)			Soil Aliquot Volume:		(uL)
		Co	oncentrat	tion Units:		

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	. О
67-64-1	acetone	28	J
78-93-3	2-butanone	54	U
71-43-2	benzene	54	U
108-10-1	4-methyl-2-pentanone	54	U
108-88-3	toluene	54	U
100-41-4	ethylbenzene	54	U
108-38-3	m,p-xylene	110	U
95-47-6	o-xylene	54	U
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Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GL-SS-GB-5 4-6
Project No.:	09928.00.01		Site:	GRINR'S LA	Location:	FREMONT, OHIO	Group:
Matrix: (soil/v	water) _	SOIL	-			Lab Sample ID:	GB5 4-6'
Sample wt/vo	l:	4.6	(g/mL)	G		Lab File ID:	LUBV037.D
Level: (low	/med)	LOW	_			Date Received:	12/17/96
% Moisture:	not dec.	0	_			Date Analyzed:	12/18/96
GC Column:	DB-5		. ID:	0.25 (r	nm)	Dilution Factor:	1.0
Soil Extract V	olume:		(uL)			Soil Aliquot Volume:	(uL)

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	Q
67-64-1	acetone	54	U
78-93-3	2-butanone	54	Ü
71-43-2	benzene	54	U
108-10-1	4-methyl-2-pentanone	54	Ū
108-88-3	toluene	. 54	U
100-41-4	ethylbenzene	54	U
108-38-3	m,p-xylene	110	U
95-47-6	o-xylene	54	U
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SAMPLE NO.

Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GL-SS-G	B-5 6-8'
Project No.:	09928.00.0	1	Site:	GRINR'S LA	Location:	FREMONT, OHIO	Group:	
Matrix: (soil/	water)	SOIL	_			Lab Sample ID:	GB5 6-8'	
Sample wt/vo	ы:	4.6	(g mL)	G		Lab File ID:	LUBV038.D	
Level: (low	r/med)	LOW	_			Date Received:	12/17/96	
% Moisture:	not dec.	0	_			Date Analyzed:	12/18/96	
GC Column:	DB-5		ID:	<u>0.25</u> (m	nm)	Dilution Factor:	1.0	
Soil Extract V	olume:		(uL)			Soil Aliquot Volume:		(uL)
					Concentrat	ion Units:		
CAS	5 N o.	Compound		(1	ug/L or ug/K	g) <u>ug/Kg</u>	a	
67.	64.1	acetone			1	64		

CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	a
67-64-1	acetone	64	
78-93-3	2-butanone	54	U
71-43-2	benzene	160	
108-10-1	4-methyl-2-pentanone	54	U
108-88-3	toluene	54	U
100-41-4	ethylbenzene	54	U
108-38-3	m,p-xylene	110	U
95-47-6	o-xylene	54	U

Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GL-SS-GE	1-5 8-10
Project No.:	09928.00.01		Site: C	GRINR'S LA	Location:	FREMONT, OHIO	Group: _	
Matrix: (soil/v	water)	SOIL	_			Lab Sample ID:	GB58-10'	
Sample wt/vo	l:	4.5	_(g/mL) _	G		Lab File ID:	LUBV039.D	
Level: (low)	/med)	LOW	_			Date Received:	12/17/96	
% Moisture:	not dec.	0	_		•	Date Analyzed:	12/18/96	
GC Column:	DB-5		ID:	0.25 (mm)	Dilution Factor:	1.0	
Soil Extract Ve	olume:		_ (uL)			Soil Aliquot Volume:		(uL)

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg)	ug/Kg Q
67-64-1	acetone	70	
78-93-3	2-butanone	56	U
71-43-2	benzene	56	U
108-10-1	4-methyl-2-pentanone	56	Ü
108-88-3	toluene	56	U
100-41-4	ethylbenzene	56	U
108-38-3	m,p-xylene	110	U
95-47-6	o-xylene	56	U
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SAMPLE NO.

GL-WS-GB-5

Lab Name:	ERM-FAST				Contract:	LUBRIZOL		
Project No.:	09928.00.01		Site:	GRINR'S	LA Location:	FREMONT, OHIO	Group: _	
Matrix: (soil/s	water) _	WATER	_			Lab Sample ID:	WSGB-5	
Sample wt/vo	d:	5.0	_(g·mL)	ML	<u>-</u>	Lab File ID:	LUBV034.D	
Level: (low	/med) _		_			Date Received:	12/17/96	
% Moisture:	not dec.	0	-			Date Analyzed:	12/18/96	
GC Column:	DB-5		ID:	0.25	_ (mm)	Dilution Factor:	1.0	
Soil Extract V	olume:	· - · - · - · · · · · · · · · · · · · ·	_(uL)			Soil Aliquot Volume:		(uL)

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/L	a
67-64-1	acetone	27	J
78-93-3	2-butanone	50	U
71-43-2	benzene	50	U
108-10-1	4-methyl-2-pentanone	50	U
108-88-3	toluene	50	U
100-41-4	ethylbenzene	50	U
108-38-3	m,p-xylene	100	U
95-47-6	o-xylene	50	U
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Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GL-SS-G	B-6 0-2'
Project No.:	09928.00.01		Site:	GRINR'S LA	Location:	FREMONT, OHIO	Group: _	
Matrix: (soil/v	water)	SOIL	_			Lab Sample ID:	GB6 0-2'	
Sample wt/vo	l: _	5.0	(g/mL)	G		Lab File ID:	LUBV047.D	
Level: (low)	/med)	LOW				Date Received:	12/18/96	
% Moisture:	not dec.	00	•			Date Analyzed:	12/18/96	
GC Column:	DB-5		ID:	0.25(m	nm)	Dilution Factor:	1.0	
Soil Extract Vo	olume:		(uL)			Soil Aliquot Volume:		(uL)

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	_
67-64-1	acetone	50	U
78-93-3	2-butanone	50	U
71-43-2	benzene	50	U
108-10-1	4-methyl-2-pentanone	50	υ
108-88-3	toluene	50	U
100-41-4	ethylbenzene	50	U
108-38-3	m,p-xylene	100	U
95-47-6	o-xylene	50	U
			
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SAMPLE NO.

GL-SS-GB-6 2-4' Lab Name: ERM-FAST Contract: LUBRIZOL Project No.: 09928.00.01 Site: GRINR'S LA Location: FREMONT, OHIO Group: Lab Sample ID: GB6 2-4' Matrix: (soil/water) SOIL Sample wt/vol: 5.0 (g'mL) ___ G Lab File ID: LUBV048.D Date Received: 12/18/96 Level: (low/med) LOW 0 Date Analyzed: 12/18/96 % Moisture: not dec. Dilution Factor: 1.0 GC Column: DB-5 ID: 0.25 (mm) Soil Aliquot Volume: (uL) Soil Extract Volume:

Concentration Units:

		Concentration Units:					
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	Q				
67-64-1	acetone	50	U				
78-93-3	2-butanone	50	U				
71-43-2	benzene	50	υ				
108-10-1	4-methyl-2-pentanone	50	U				
108-88-3	toluene	50	U				
100-41-4	ethylbenzene	50	U				
108-38-3	m,p-xylene	100	U				
95-47-6	o-xylene	50	U				
							

SAMPLE NO.

21 -SS-GR-6 4-6

Lab Name: ERM-FAST			Contract:	LUBRIZOL	GE-33-GB-0 4-0
Project No.: 09928.00.01	t	Site: GRINR'S LA	Location:	FREMONT, OHIO	Group:
Matrix: (soil/water)	SOIL	_		Lab Sample ID:	GB64-6'
Sample wt/vol:	4.7	(g/mL) G		Lab File ID:	LUBV049.D
Level: (low/med)	LOW	-		Date Received:	12/18/96
% Moisture: not dec.	0	_		Date Analyzed:	12/18/96
GC Column: DB-5		ID: 0.25 (m	ım)	Dilution Factor:	1.0
Soil Extract Volume:		_(uL)		Soil Aliquot Volume:	(uL)

		Concentration On		
CAS No.	Compound	(ug/L or ug/Kg)	ug/Kg	Q
67-64-1	acetone		80	
78-93-3	2-butanone		53	Ü
71-43-2	benzene		53	Ü
108-10-1	4-methyl-2-pentanone	1	50	
108-88-3	toluene		53	Ü
100-41-4	ethylbenzene		53	Ū
108-38-3	m,p-xylene	1	10	U
95-47-6	o-xylene		53	Ü
				
				
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SAMPLE NO.

21 -SS-GR-6 6.8'

Lab Name:	ERM-FAST	·			Contract:	LUBRIZOL	GE-33-GD-0 0 0
Project No.:	09928.00.01		Site:	GRINR'S L	A Location:	FREMONT, OHIO	Group:
Matrix: (soil/	water)	SOIL	-			Lab Sample ID:	GB66-8'
Sample wt/vo): _	4.5	(g.mL)	G		Lab File ID:	LUBV050.D
Level: (low	/med)	LOW	-			Date Received:	12/18/96
% Moisture:	not dec.	0	-			Date Analyzed:	12/18/96_
GC Column:	DB-5		ID:	0.25	(mm)	Dilution Factor:	1.0
Soil Extract V	olume:		(uL)			Soil Aliquot Volume:	(uL)

Concentration Units:	Concen	tration	Units:
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		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	a
67-64-1	acetone	110	
78-93-3	2-butanone	56	Ü
71-43-2	benzene	56	U
108-10-1	4-methyl-2-pentanone	230	
108-88-3	toluene	56	U
100-41-4	ethylbenzene	56	U
108-38-3	m,p-xylene	110	U
95-47-6	o-xylene	56	U
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SAMPLE NO.

Lab Name: ERM-FAST			Contract:	LUBRIZOL	GL-SS-GB-6 8-10'
Project No.: 09928.00.0	1	Site: GRINR'S LA	Location:	FREMONT, OHIO	Group:
Matrix: (soil/water)	SOIL			Lab Sample ID:	GB68-10'
Sample wt/vol:	4.8 (g	J/mL)G		Lab File ID:	LUBV051.D
Level: (low/med)	LOW			Date Received:	12/18/96
% Moisture: not dec.	0			Date Analyzed:	12/18/96_
GC Column: DB-5		ID: 0.25 (mi	m)	Dilution Factor:	1.0
Soil Extract Volume:	(u	ıL)		Soil Aliquot Volume:	(uL)
			Concentrat	ion Units:	

CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	a
67-64-1	acetone	3600	T
78-93-3	2-butanone	61	
71-43-2	benzene	52	Ü
108-10-1	4-methyl-2-pentanone	3200	
108-88-3	toluene	52	U
100-41-4	ethylbenzene	52	U
108-38-3	m,p-xylene	100	U
95-47-6	o-xylene	52	U
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SAMPLE NO.

GL-WS-GB-6 Lab Name: ERM-FAST Contract: LUBRIZOL Site: GRINR'S LA Location: FREMONT, OHIO Project No.: 09928.00.01 Group: WATER Matrix: (soil/water) Lab Sample ID: WSGB-6 4.8 (g/mL) Lab File ID: LUBV046.D Sample wt/vol: ML Date Received: 12/18/96 Level: (low/med) 0 Date Analyzed: 12/18/96 % Moisture: not dec. Dilution Factor: 1.0 GC Column: DB-5 ID: 0.25 (mm) Soil Aliquot Volume: Soil Extract Volume: (uL) (uL)

Concentration Units:					
Compound	(ug/L or ug/Kg)	ug/L	Q		
acetone	5	3	U		
2-butanone	5	3	U		
benzene	5	3	Ü		
4-methyl-2-pentanone	5	3	U		
toluene	5	3	U		
ethylbenzene	5	3	U		
	110	0	U		
o-xylene	5	3	U		
			-		
	acetone 2-butanone benzene 4-methyl-2-pentanone toluene ethylbenzene m,p-xylene	acetone 5 2-butanone 5 benzene 5 4-methyl-2-pentanone 5 toluene 5 ethylbenzene 5 m,p-xylene 11	acetone 53 2-butanone 53 benzene 53 4-methyl-2-pentanone 53 toluene 53 ethylbenzene 53 m,p-xylene 110		

SAMPLE NO

GL-SS-GB-7 0-2'

Lab Name:	ERM-FAST		_		Contract:	LUBRIZOL	GL-33-G	
Project No.:	09928.00.01		Site:	GRINR'S LA	Location:	FREMONT, OHIO	Group:	
Matrix: (soil/	water)	SOIL	·			Lab Sample ID:	GB7 0-2'	
Sample wt/vo	ol:	4.6	(g/mL)	G		Lab File ID:	LUBV073.D	
Level: (low	/med)	LOW				Date Received:	12/19/96	
% Moisture:	not dec.	0				Date Analyzed:	12/19/96	
GC Column:	DB-5		ID:	0.25(m	ım)	Dilution Factor:	1.0	
Soil Extract V	olume:		(uL)			Soil Aliquot Volume:		(uL)

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	Q
67-64-1	acetone	47	J
78-93-3	2-butanone	54	U
71-43-2	benzene	54	U
108-10-1	4-methyl-2-pentanone	72	
108-88-3	toluene	54	U
100-41-4	ethylbenzene	54	U
108-38-3	m,p-xylene	110	U
95-47-6	o-xylene	54	U
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SAMPLE NO.

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Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GL-35-GB-7 2-4
Project No.:	09928.00.01		Site:	GRINR'S	LA Location:	FREMONT, OHIO	Group:
Matrix: (soil/	water) _	SOIL	_			Lab Sample ID:	GB7 2-4'
Sample wt/vo	ol: _	4.5	_(g.mL)	G	_	Lab File ID:	LUBV056.D
Level: (low	r-med)	LOW	-			Date Received:	12/18/96
% Moisture:	not dec.	0	_			Date Analyzed:	12/19/96
GC Column:	DB-5		ID:	0 25	_ (mm)	Dilution Factor:	1.0
Soil Extract V	olume:		(uL)			Soil Aliquot Volume:	(uL)

		Concentration Units:				
CAS No.	Compound	(ug/L or ug/Kg)	ug/Kg	a		
67-64-1	acetone	5	56	U		
78-93-3	2-butanone	5	56	U		
71-43-2	benzene	5	56	U		
108-10-1	4-methyl-2-pentanone	5	56	U		
108-88-3	toluene	5	56	Ú		
100-41-4	ethylbenzene		56	U		
108-38-3	m,p-xylene	11	10	U		
95-47-6	o-xylene	5	56	U		
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SAMPLE NO.

GL-SS-GB-7 4-6'

Lab Name: ERM-FAST			Contract:	LUBRIZOL	GE-00-GD-7 4-0
Project No.: 09928.00.0	1	Site: GRINR'S LA	Location:	FREMONT, OHIO	Group:
Matrix: (soil/water)	SOIL			Lab Sample ID:	GB7 4-6'
Sample wt/vol:	4.9	(g/mL) G		Lab File ID:	LUBV058.D
Level: (low/med)	LOW			Date Received:	12/18/96
% Moisture: not dec.	0			Date Analyzed:	12/19/96
GC Column: DB-5		ID: <u>0.25</u> (m	m)	Dilution Factor:	1.0
Soil Extract Volume:		(uL)		Soil Aliquot Volume:	(uL)

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	a
67-64-1	acetone	51	T U
78-93-3	2-butanone	51	U
71-43-2	benzene	51	U
108-10-1	4-methyl-2-pentanone	51	Ü
108-88-3	toluene	51	U
100-41-4	ethylbenzene	51	U
108-38-3	m,p-xylene	100	U
95-47-6	o-xylene	51	U
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SAMPLE NO.

Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GE-33-0	IB-7 U-0
COU HOING.	EMPLAGE				Contract.	COBINECC		
Project No.:	09928.00.01		Site:	GRINR'S L	A Location:	FREMONT, OHIO	Group:	
Matrix: (soil/	water) _	SOIL	_			Lab Sample ID:	GB7 6-8'	
Sample wt/vo	J: _	4.8	(g·mL)	G		Lab File ID:	LUBV082.D	
Level: (low	/med)	LOW	_			Date Received:	12/19/96	
% Moisture:	not dec.	0	_			Date Analyzed:	12/20/96	
GC Column:	DB-5		ID:	0.25	(mm)	Dilution Factor:	1.0	
Soil Extract V	olume:		_(uL)			Soil Aliquot Volume:		(uL)
					Concentrat	tion Units:		

(ug/L or ug/Kg)	_ug/Kg
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CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	a
67-64-1	acetone	33	, l
78-93-3	2-butanone	52	U
71-43-2	benzene	52	U
108-10-1	4-methyl-2-pentanone	52	U
108-88-3	toluene	52	U
100-41-4	ethylbenzene	52	υ
108-38-3	m,p-xylene	100	U
95-47-6	o-xylene	52	U
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SAMPLE NO.

Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GL-SS-GB-7 8-10'
Project No.:	09928.00.01		Site:	GRINR'S LA	Location:	FREMONT, OHIO	Group:
Matrix: (soil/v	water)	SOIL	_			Lab Sample ID:	GB78-10'
Sample wt/vo	l:	4.5	_(g/mL)	G		Lab File ID:	LUBV060.D
Level: (low	/med)	LOW	-			Date Received:	12/18/96
% Moisture:	not dec.	0	_			Date Analyzed:	12/19/96
GC Column:	DB-5		ID:	0.25 (m	m)	Dilution Factor:	1.0
Soil Extract V	olume:		_ (uL)			Soil Aliquot Volume:	(uL)

CAS No. Compound (ug/L or ug/Kg) 67-64-1 acetone 78-93-3 2-butanone 71-43-2 benzene 108-10-1 4-methyl-2-pentanone 100-41-4 ethylbenzene 108-38-3 m,p-xylene 95-47-6 o-xylene	97 56 56 56 56	Q U U
78-93-3 2-butanone 71-43-2 benzene 108-10-1 4-methyl-2-pentanone 108-88-3 toluene 100-41-4 ethylbenzene 108-38-3 m,p-xylene	56 56 56 56	U
71-43-2 benzene 108-10-1 4-methyl-2-pentanone 108-88-3 toluene 100-41-4 ethylbenzene 108-38-3 m,p-xylene	56 56 56	U
108-10-1 4-methyl-2-pentanone 108-88-3 toluene 100-41-4 ethylbenzene 108-38-3 m,p-xylene	56 56	
108-88-3 toluene 100-41-4 ethylbenzene 108-38-3 m,p-xylene	56	U
100-41-4 ethylbenzene 108-38-3 m,p-xylene		
108-38-3 m,p-xylene		U
	56	U
95-47-6 o-xylene	110	U
	56	U
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SAMPLE NO.

GL-SS-GB-7 10-12'

ERM-FAST Contract: LUBRIZOL Lab Name: Site: GRINR'S LA Location: FREMONT, OHIO Project No.: 09928.00.01 Group: SOIL Matrix: (soil/water) Lab Sample ID: GB710-12 4.5 Sample wt/vol: (g mL) 3 Lab File ID: LUBV061.D Level: (low/med) LOW Date Received: 12/18/96 % Moisture: not dec. 0 Date Analyzed: 12/19/96 GC Column: DB-5 ID: 0 25 (mm) Dilution Factor: 1.0 Soil Aliquot Volume: Soil Extract Volume: ____ (uL) (uL) Concentration Units:

Conce	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	OTRUS.	
ug/L or	ug/Kg)	_	ι

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/K	<u>g</u> 0
67-64-1	acetone	20000	1
78-93-3	2-butanone	290	
71-43-2	benzene	56	U
108-10-1	4-methyl-2-pentanone	5800	
108-88-3	toluene	32	J
100-41-4	ethylbenzene	56	U
108-38-3	m,p-xylene	110	U
95-47-6	o-xylene	56	U
			
			
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SAMPLE NO.

GL-WS-GB-7

Lab Name: ERM-FAST			Contract:	LUBRIZOL	GL-W3-GB-/
Project No.: 09928.00.0	1	Site: GRINR'S	A Location:	FREMONT, OHIO	Group:
Matrix: (soil/water)	WATER	_		Lab Sample ID:	WSGB-7
Sample wt/vol:	5.0	(g/mL) ML	<u>.</u>	Lab File ID:	LUBV052.D
Level: (low/med)		_		Date Received:	12/18/96
% Moisture: not dec.	0	_		Date Analyzed:	12/19/96
GC Column: DB-5		ID: 0.25	_(mm)	Dilution Factor:	1.0
Soil Extract Volume:		_ (uL)		Soil Aliquot Volume:	(uL)

04011		Concentration Onlis:	•
CAS No.	Compound	(ug/L or ug/Kg) ug/L	Ω
67-64-1	acetone	50	U
78-93-3	2-butanone	50	U
71-43-2	benzene	50	U
108-10-1	4-methyl-2-pentanone	50	U
108-88-3	toluene	50	U
100-41-4	ethylbenzene	50	U
108-38-3	m,p-xylene	100	U
95-47-6	o-xylene	50	U
			
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SAMPLE NO.

					GL-SS-G	R-8 0-1
Lab Name: ERM-FAST			_ Contract:	LUBRIZOL		
Project No.: <u>09928.00.</u>	<u>0</u> 1	Site: GRINR'S	LA Location:	FREMONT, OHIO	Group:	
Matrix: (soil/water)	SOIL			Lab Sample ID:	GB8 0-2'	
Sample wt/vol:	4.7	(g mL) G	_	Lab File ID:	LUBV075.D	
Level: (low/med)	LOW			Date Received:	12/19/96	
% Moisture: not dec.	0			Date Analyzed:	12/19/96	
GC Column: DB-5		ID: 0.25	(mm)	Dilution Factor:	1.0	
Soil Extract Volume:		(uL)		Soil Aliquot Volume:		(uL)
			Concentra	tion Units:		
CAS No.	Compound		(ug/L or ug/K		Q	
67-64-1	acetone			53	U T	
78-93-3	2-butanone			53	U	
71-43-2	benzene			53	U	
108-10-1	4-methyl-2-p	pentanone		53	U	
108-88-3	toluene			53	U	
100-41-4	ethylbenzen	 e		53	U	
108-38-3	m,p-xylene	· · · · · · · · · · · · · · · · · · ·		110	U	
95-47-6	o-xylene			53	U	
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Lab Name: ERM-FAST	<u>·</u>		Contract:	LUBRIZOL	GL-SS-GB-8 2-4
Project No.: 09928.00.01	l	Site: GRINR'S LA	Location:	FREMONT, OHIO	Group:
Matrix: (soil/water)	SOIL			Lab Sample ID:	GB8 2-4'
Sample wt/vol:	4.7	(g/mL) <u>G</u>		Lab File ID:	LUBV076.D
Level: (low/med)	LOW			Date Received:	12/19/96
% Moisture: not dec.	0			Date Analyzed:	12/19/96
GC Column: DB-5		ID: 0.25 (m	m)	Dilution Factor:	1.0
Soil Extract Volume:	((uL)		Soil Aliquot Volume:	(uL)

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	_
67-64-1	acetone	53	U
78-93-3	2-butanone	53	U
71-43-2	benzene	53	U
108-10-1	4-methyl-2-pentanone	53	U
108-88-3	toluene	53	U
100-41-4	ethylbenzene	53	U
108-38-3	m,p-xylene	110	U
95-47-6	o-xylene	53	Ü
			
			
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SAMPLE NO.

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Dilution Factor: 1.0

GL-SS-GB-8 4-6' Lab Name: **ERM-FAST** Contract: LUBRIZOL Project No.: 09928.00.01 Site: GRINR'S LA Location: FREMONT, OHIO Group: Matrix: (soil/water) SOIL Lab Sample ID: GB8 4-6' 4.5 Sample wt/vol: (g·mL) G Lab File ID: LUBV077.D (low/med) LOW Date Received: 12/19/96 Level: 0 % Moisture: not dec. Date Analyzed: 12/19/96

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____

ID: 0.25 (mm)

GC Column: DB-5

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	. Q
67-64-1	acetone	56	U
78-93-3	2-butanone	56	υ
71-43-2	benzene	56	υ
108-10-1	4-methyl-2-pentanone	56	U
108-88-3	toluene	56	U
100-41-4	ethylbenzene	56	U
108-38-3	m,p-xylene	110	U
95-47-6	o-xylene	56	U
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SAMPLE NO.

GL-SS-GB-8 6-8'

Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GE-33-G	
Project No.:	09928.00.01	}	Site: Gl	RINR'S LA	Location:	FREMONT, OHIO	Group:	
Matrix: (soil/	(water)	SOIL				Lab Sample ID:	GB8 6-8'	
Sample wt/vo	ol:	4.7	(g/mL)	G		Lab File ID:	LUBV078.D	
Level: (low	v/med)	LOW				Date Received:	12/19/96	
% Moisture:	not dec.	0				Date Analyzed:	12/19/96	
GC Column:	DB-5		ID:	0.25 (m	ım)	Dilution Factor:	1.0	
Soil Extract V	/olume:		(uL)			Soil Aliquot Volume:		(uL)

Concentration Units:

		Concentration Units:	•
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	- a
67-64-1	acetone	75	
78-93-3	2-butanone	53	U
71-43-2	benzene	53	U
108-10-1	4-methyl-2-pentanone	53	U
108-88-3	toluene	53	U
100-41-4	ethylbenzene	53	U
108-38-3	m,p-xylene	110	U
95-47-6	o-xylene	53	Ü
			
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SAMPLE NO.

GL-SS-GB-8 8-10'

Lab Name:	ERM-FAST	····		Contract:	LUBRIZOL	GE-00-00-0 10
Project No.:	09928.00.01		Site: GRINR'S LA	Location:	FREMONT, OHIO	Group:
Matrix: (soil/v	water) _	SOIL	_		Lab Sample ID:	GB88-10'
Sample wt/vol	l: _	4.6	(g·mL) G		Lab File ID:	LUBV079.D
Level: (low/	med)	LOW	_		Date Received:	12/19/96
% Moisture:	not dec.	00	_		Date Analyzed:	12/19/96
GC Column:	DB-5	<u> </u>	ID: <u>0.25</u> (n	nm)	Dilution Factor:	1.0
Soil Extract Vo	olume:		(uL)		Soil Aliquot Volume:	(uL)

CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	Q
67-64-1	acetone	8600	
78-93-3	2-butanone	200	
71-43-2	benzene	54	U
108-10-1	4-methyl-2-pentanone	2600	
108-88-3	toluene	54	U
100-41-4	ethylbenzene	54	U
108-38-3	m,p-xylene	110	U
95-47-6	o-xylene	54	U
			
			

SAMPLE NO.

GL-SS-GB-8 10-12'

Lab Name: ERM-FAST		Contract	LUBRIZOL	
Project No.: 09928.00.01		Site: GRINR'S LA Location	FREMONT, OHIO	Group:
Matrix: (soil/water)	SOIL		Lab Sample ID:	GB810-12
Sample wt/vol:	4.8	(g/mL)G	Lab File ID:	LUBV080.D
Level: (low/med)	LOW		Date Received:	12/19/96
% Moisture: not dec.	0		Date Analyzed:	12/20/96
GC Column: DB-5		ID: 0.25 (mm)	Dilution Factor:	1.0
Soil Extract Volume:		(uL)	Soil Aliquot Volume:	{uL}

	Concentration Units:				
CAS No.	Compound	(ug/L or ug/Kg)	ug/Kg	a	
67-64-1	acetone	15	0		
78-93-3	2-butanone	5	2	U	
71-43-2	benzene	5	2	U	
108-10-1	4-methyl-2-pentanone	3	6	J	
108-88-3	toluene	5	2	U	
100-41-4	ethylbenzene	5	2	U	
108-38-3	m,p-xylene	10	0	U	
95-47-6	o-xylene	5	2	U	
					

SAMPLE NO.

GL-WS-GB-8

Lab Name:	ERM-FAST				Contract:	LUBRIZOL	dr-wo-db-c	
Project No.:	09928.00.01		Site:	GRINR'S LA	Location:	FREMONT, OHIO	Group:	
Matrix: (soil:	water) _	WATER	_			Lab Sample ID:	WSGB-8	
Sample wt/vo	ol:	5.0	_(g mL)	ML		Lab File ID:	LUBV062.D	
Level: (low	r/med)		_			Date Received:	12/18/96	
% Moisture:	not dec.	0	_			Date Analyzed:	12/19/96	
GC Column:	DB-5		_ ID:	0.25	mm)	Dilution Factor:	1.0	
Soil Extract V	olume:		(uL)			Soil Aliquot Volume:	(uL)	

<u> </u>	 	 Units:

CAS No.	Compound	(ug/L or ug/Kg) ug/L	a
67-64-1	acetone	28	J
78-93-3	2-butanone	50	U
71-43-2	benzene	50	U
108-10-1	4-methyl-2-pentanone	50	U
108-88-3	toluene	50	U
100-41-4	ethylbenzene	50	U
108-38-3	m,p-xylene	100	U
95-47-6	o-xylene	50	U
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Lab Name: ERM-FAST			Contract:	LUBRIZOL	GL-SS-GB-9 0-2
Project No.: 09928.00.0	ı	Site: GRINR'S LA	Location:	FREMONT, OHIO	Group:
Matrix: (soil/water)	SOIL			Lab Sample ID:	GB9 0-2'
Sample wt/vol:	4.8	(g/mL) <u>G</u>		Lab File ID:	LUBV083.D
Level: (low/med)	LOW	_		Date Received:	12/19/96
% Moisture: not dec.	0	_		Date Analyzed:	12/20/96
GC Column: DB-5		ID: 0.25 (m	ım)	Dilution Factor:	1.0
Soil Extract Volume:		_ (uL)		Soil Aliquot Volume:	(uL)

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	a
67-64-1	acetone	52	U
78-93-3	2-butanone	52	U
71-43-2	benzene	52	U
108-10-1	4-methyl-2-pentanone	52	U
108-88-3	toluene	52	U
100-41-4	ethylbenzene	52	U
108-38-3	m,p-xylene	100	U
95-47-6	o-xylene	52	U
			
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FORM I VOA

Site: GRINR'S LA Location: FREMONT, OHIO

SAMPLE NO.

Group:

Lab Name: ERM-FAST Contract: LUBRIZOL GL-SS-GB-9 2-4'

Matrix: (soil/water) SOIL Lab Sample ID: GB9 2-4'

Project No.: 09928.00.01

Sample wt/vol: 4.8 (g mL) __G Lab File ID: LUBV084.D

Level: (low/med) LOW Date Received: 12/19/96

 % Moisture:
 not dec.
 0
 Date Analyzed:
 12/20/96

 GC Column:
 DB-5
 ID: 0.25 (mm)
 Dilution Factor:
 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

		Concentration Units:				
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	Q			
67-64-1	acetone	52	U			
78-93-3	2-butanone	52	U			
71-43-2	benzene	52	U			
108-10-1	4-methyl-2-pentanone	52	U			
108-88-3	toluene	52	U			
100-41-4	ethylbenzene	52	U			
108-38-3	m,p-xylene	100	U			
95-47-6	o-xylene	52	U			
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SAMPLE NO.

Lab Name: ERM	M-FAST		Contract:	LUBRIZOL	GL-33-GB-9 4-0
Project No.: 099	928.00.01	Site: GRINR'S LA	Location:	FREMONT, OHIO	Group:
Matrix: (soil/wate	er) SOIL	_		Lab Sample ID:	GB9 4-6'
Sample wt/vol:	5.0	(g/mL) G		Lab File ID:	LUBV085.D
Level: (low/med	d) LOW	_		Date Received:	12/19/96
% Moisture: not	dec. <u>0</u>	_		Date Analyzed:	12/20/96
GC Column: DB-	5	ID: 0.25 (m	ım)	Dilution Factor:	1.0
Soil Extract Volum	ne:	_(uL)		Soil Aliquot Volume:	(uL)

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	Q
67-64-1	acetone	93	
78-93-3	2-butanone	50	U
71-43-2	benzene	50	U
108-10-1	4-methyl-2-pentanone	50	U
108-88-3	toluene	50	U
100-41-4	ethylbenzene	50	U
108-38-3	m,p-xylene	100	U
95-47-6	o-xylene	50	U
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SAMPLE NO.

Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GL-SS-C	3 B -9 6-8'
Project No.;	09928.00.0	1	Site:	GRINR'S L	A Location:	FREMONT, OHIO	Group:	
Matrix: (so	il/water)	SOIL				Lab Sample ID:	GB9 6-8'	
Sample wt/	vol:	4.6	(g·mL)	G	_	Lab File ID:	LUBV086.D	
Level: (lo	w≀med)	LOW				Date Received:	12/19/96	ı
% Moisture:	not dec.	0				Date Analyzed:	12/20/96	
GC Column:	DB-5		ID:	0.25	(mm)	Dilution Factor:	1.0	
Soil Extract	Volume:		(uL)			Soil Aliquot Volume:		(uL)
					Concentrat	ion Units:		
C	AS No.	Compound			(ug/L or ug/K	g) <u>ug/Kg</u>	Q	
67	7-64-1	acetone				34000		Ì
78	3-93-3	2-butanone				300		

CAS No.	Compound	(ug/L or ug/Kg)	ug/Kg_	Q
67-64-1	acetone	34000		
78-93-3	2-butanone	300		
71-43-2	benzene	54		U
108-10-1	4-methyl-2-pentanone	150000		
108-88-3	toluene	410		·
100-41-4	ethylbenzene	54		U
108-38-3	m,p-xylene	110		U
95-47-6	o-xylene	54		U
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SAMPLE NO.

GL-SS-GB-9 8-10'

Lab Name: <u>E</u>	RM-FAST			Contract:	LUBRIZOL	GC-33-GB-3 6-10	
Project No.: 0	9928.00.01	Site	: GRINR'S LA	Location:	FREMONT, OHIO	Group:	
Matrix: (soil/wa	ater) SOI	<u></u>			Lab Sample ID:	GB98-10'	
Sample wt/vol:	4.7	(g/mL)	G		Lab File ID:	LUBV087.D	
Level: (low/m	ned) LOV				Date Received:	12/19/96	
% Moisture: n	ot dec. 0				Date Analyzed:	12/20/96	
GC Column: D)B-5	ID	: <u>0.25</u> (n	nm)	Dilution Factor:	1.0	
Soil Extract Vol	ume:	(uL)			Soil Aliquot Volume:	(uL)	

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	_
67-64-1	acetone	190000	
78-93-3	2-butanone	2000	
71-43-2	benzene	53	Ū
108-10-1	4-methyl-2-pentanone	57000	
108-88-3	toluene	53	U
100-41-4	ethylbenzene	53	U
108-38-3	m,p-xylene	110	U
95-47-6	o-xylene	53	υ

SAMPLE NO.

Lab Name	: ERM-FAST				Contract:	LUBRIZOL	GL-W	S-GB-9
Project No	.: 09928.00.0	1	Site:	GRINR'S L	A Location:	FREMONT, OHIO	Group:	
Matrix: (s	oil/water)	WATER				Lab Sample ID:	WSGB9 RE	
Sample wi	t/vol:	5.0	(g mL)	ML		Lab File ID:	LUBV095.D	
Level: (low/med)					Date Received:	12/19/96	
% Moistur	e: not dec.	0				Date Analyzed:	12/21/96_	
GC Colum	n: <u>DB-5</u>	<u></u>	ID:	0.25	(mm)	Dilution Factor:	1.0	
Soil Extrac	t Volume:	_	(uL)			Soil Aliquot Volume:		(uL)
					Concentrat			
(CAS No.	Compound			(ug/L or ug/K	g) <u>ug/L</u>	<u> </u>	
[57-64-1	acetone				83		
[2	78-93-3	2-butanone				50	U	
	71-43-2	benzene				50	U	
<u>[1</u>	108-10-1	4-methyl-2-	pentanon	2		93		
[1	108-88-3	toluene				50	U	
	100-41-4	ethylbenzen	e			50	U	
	08-38-3	m,p-xylene				100	υ	
	95-47-6	o-xylene				50	U	
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SAMPLE NO.

GL-SS-GB-10 0-2

Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GE-00-GB-10-0-2
Project No.:	09928.00.01		Site:	GRINR'S L	A Location:	FREMONT, OHIO	Group:
Matrix: (soil/	water)	SOIL	_			Lab Sample ID:	GB100-2'
Sample wt/vo	l:	4.8	_(g/mL)	G		Lab File ID:	LUBV089.D
Level: (low	/med)	LOW	_			Date Received:	12/19/96
% Moisture:	not dec.	0	_			Date Analyzed:	12/20/96
GC Column:	DB-5	<u> </u>	ID:	0.25	(mm)	Dilution Factor:	1.0
Soil Extract V	olume:		_ (uL)			Soil Aliquot Volume:	(uL)

CAS No.	Compound	(ug/L or ug/Kg)	ug/Kg	Q
67-64-1	acetone		52	U
78-93-3	2-butanone		52	U
71-43-2	benzene		52	U
108-10-1	4-methyl-2-pentanone		52	U
108-88-3	toluene		52	U
100-41-4	ethylbenzene		52	U
108-38-3	m,p-xylene	10	00	U
95-47-6	o-xylene		52	Ü
				
				
				
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SAMPLE NO.

GL-SS-GB-10 2-4

Lab Name:	ERM-FAST				_ Contract:	LUBRIZOL	GL-33-GB-10	£-
Project No.:	09928.00.01		Site:	GRINR'S	LA Location:	FREMONT, OHIO	Group:	
Matrix: (soil/s	water)	SOIL	-			Lab Sample ID:	GB102-4'	
Sample wt/vo	l: _	4.9	_ (g 'mL)	G	_	Lab File ID:	LUBV090.D	
Level: (low	rmed)	LOW	_			Date Received:	12/19/96	
% Moisture:	not dec.	0	_			Date Analyzed:	12/21/96	
GC Column:	DB-5		_ ID:	0.25	_ (mm)	Dilution Factor:	1.0	
Soil Extract V	olume:		(uL)			Soil Aliquot Volume:	(uL)	
					Concentrat	tion Units:		

		Concentration Units:						
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	_					
67-64-1	acetone	430						
78-93-3	2-butanone	220						
71-43-2	benzene	97						
108-10-1	4-methyl-2-pentanone	51	U					
108-88-3	toluene	51	U					
100-41-4	ethylbenzene	51	U					
108-38-3	m,p-xylene	100	U					
95-47-6	o-xylene	51	υ					
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FORM I VOA

SAMPLE NO

GL-SS-GB-10 4-6'

Lab Name: ERM-FAS	<u> </u>		Contract:	LUBRIZOL	GL-33-GD-1	U 4-0
Project No.: 09928.00	.01	Site: GRINR'S LA	Location:	FREMONT, OHIO	Group:	
Matrix: (soil/water)	SOIL			Lab Sample ID:	GB104-6'	
Sample wt/vol:	5.0	(g/mL) <u>G</u>		Lab File ID:	LUBV091.D	
Level: (low/med)	LOW			Date Received:	12/19/96	
% Moisture: not dec.	0			Date Analyzed:	12/21/96	
GC Column: DB-5		ID: <u>0.25</u> (m	m)	Dilution Factor:	1.0	
Soil Extract Volume:		(uL)		Soil Aliquot Volume:	{(i)	uL)
			_			

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	a
67-64-1	acetone	77	
78-93-3	2-butanone	50	U
71-43-2	benzene	50	U
108-10-1	4-methyl-2-pentanone	50	U
108-88-3	toluene	50	U
100-41-4	ethylbenzene	50	U
108-38-3	m,p-xylene	100	U
95-47-6	o-xylene	50	U
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SAMPLE NO.

Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GL-SS-GI	B-10 6-8°
Project No.:	09928.00.01		Site:	GRINR'S L	A Location:	FREMONT, OHIO	Group: _	<u> </u>
Matrix: (soil/	(water)	SOIL	_			Lab Sample ID:	GB106-8'	
Sample wt/vo	d: _	4.6	_ (g:mL)	G		Lab File ID:	LUBV092.D	
Level: (low	r∤med) _	LOW	_			Date Received:	12/19/96	
% Moisture:	not dec.	0	_			Date Analyzed:	12/21/96	
GC Column:	DB-5		ID:	0 25	(mm)	Dilution Factor:	1.0	
Soil Extract V	/olume: _		_ (uL)			Soil Aliquot Volume:		(uL)
					Concentrat	tion Units:		

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ıg/L	or	ug.	/Kg)	

CAS No.	Compound	(ug/L or ug/Kg)	ug/Kg	Q
67-64-1	acetone	5	7	Ĭ
78-93-3	2-butanone	5	4	U
71-43-2	benzene	5	4	U
108-10-1	4-methyl-2-pentanone	5	4	υ
108-88-3	toluene	5	4	Ū
100-41-4	ethylbenzene	5	4	U
108-38-3	m,p-xylene	11	0	U
95-47-6	o-xylene	5	4	U
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SAMPLE NO

GL-SS-GB-10 8-10'

Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GL-33-GD-10 8-10
Project No.:	09928.00.01	İ	Site:	GRINR'S.LA	Location:	FREMONT, OHIO	Group:
Matrix: (soil/	water)	SOIL	_			Lab Sample ID:	GB108-10
Sample wt/vo	l:	4.9	(g/mL)	G		Lab File ID:	LUBV163.D
Level: (low	/med)	LOW	_			Date Received:	12/18/96
% Moisture:	not dec.	0				Date Analyzed:	12/31/96
GC Column:	DP5		ID:	0.25(m	ım)	Dilution Factor:	1.0
Soil Extract Vo	olume:		(uL)			Soil Aliquot Volume:	(uL)

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	_
67-64-1	acetone	180	
78-93-3	2-butanone	51	Ü
71-43-2	benzene	51	U
108-10-1	4-methyl-2-pentanone	51	U
108-88-3	toluene	51	U
100-41-4	ethylbenzene	51	U
108-38-3	m,p-xylene	100	U
95-47-6	o-xylene	51	U
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SAMPLE NO.

Lab Name:	ERM-FAST				Contract	LUBRIZOL	GL-WS	S-GB-10
	09928.00.01		Site	GRINB'S LA		FREMONT, OHIO	Group:	
			Site.	GNINA 3 LA	Location:		•	
Matrix: (soil/	(water)	WATER				Lab Sample ID:	WSGB-10	
Sample wt/vo	:k	5.0	(g·mL)	ML		Lab File ID	LUBV088.D	
Level: (low	r/med)					Date Received	: 12/19/96	
% Moisture:	not dec.	0				Date Analyzed	12/20/96	
GC Column:	DB-5	_	ID:	0.25	mm)	Dilution Factor	: 1.0	
Soil Extract V	olume:		(uL)			Soil Aliquot Volume	:	(uL)
					Concentrat	tion Units:		
CAS	S No.	Compound		(lug/L or ug/K	g) <u>ug/L</u>	Q	
67-	64-1	acetone			T	50	U	
78-	93-3	2-butanone				50	U	
—		benzene				50	U	
		4-methyl-2-	pentanor	ъе		50	U	
		toluene			<u> </u>	50	U	
		ethylbenzen	e		ļ	50	U	
		m,p-xylene			_	100	l U	
95-	47-6	o-xylene		<u> </u>	<u> </u>	50	U	
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Lab Name: EF	RM-FAST				Contract:	LUBRIZOL	GL-SS-GB-11 0-2
Project No.: 09	9928.00.01		Site:	GRINR'S LA	Location:	FREMONT, OHIO	Group:
Matrix: (soil/wat	ter)	SOIL				Lab Sample ID:	GB110-2
Sample wt/vol:		5.6	(g/mL)	G		Lab File ID:	LUBV100.D
Level: (low/me	ed) L	_ow				Date Received:	12/19/96
% Moisture: no	ot dec.	0	•			Date Analyzed:	12/24/96
GC Column: DE	B-5		1D:	0.25 (n	nm)	Dilution Factor:	1.0
Soil Extract Volu	me:		(uL)			Soil Aliquot Volume:	(uL)

		Concentration on		•
CAS No.	Compound	(ug/L or ug/Kg)	ug/Kg	Q
67-64-1	acetone		45	U
78-93-3	2-butanone		45	U
71-43-2	benzene		45	Ü
108-10-1	4-methyl-2-pentanone		45	Ū
108-88-3	toluene		45	U
100-41-4	ethylbenzene		45	U
108-38-3	m,p-xylene		89	U
95-47-6	o-xylene		45	U
				
				
				
				
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SAMPLE NO.

GL-SS-GB-11 2-4' Lab Name: ERM-FAST Contract: LUBRIZOL

Project No.: 09928.00.01 Site: GRINR'S LA Location: FREMONT, OHIO Group:

Matrix: (soil/water) SOIL Lab Sample ID: GB112-4

Sample wt/vol: 4.9 (g/mL) G Lab File ID: LUBV101.D

LOW Date Received: 12/19/96 Level: (low/med) Date Analyzed: 12/24/96 0 % Moisture: not dec.

GC Column: DB-5 Dilution Factor: 1.0 ID: 0.25 (mm)

(uL)

Soil Extract Volume:

Soil Aliquot Volume: (uL)

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	Q
67-64-1	acetone	51	U
78-93-3	2-butanone	51	U
71-43-2	benzene	51	U
108-10-1	4-methyl-2-pentanone	51	Ü
108-88-3	toluene	51	U
100-41-4	ethylbenzene	51	U
108-38-3	m,p-xylene	100	U
95-47-6	o-xylene	51	U
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SAMPLE NO

GL-SS-GB-11 4-6'

Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GL-33-GB-1	7
Project No.:	09928.00.01		Site:	GRINR'S LA	Location:	FREMONT, OHIO	Group:	
Matrix: (soil/w	vater)	SOIL	-			Lab Sample ID:	GB114-6	
Sample wt/vol	: _	5.3	_(g/mL)	G		Lab File ID:	LUBV102.D	
Level: (low/	med)	LOW	_			Date Received:	12/19/96	
% Moisture:	not dec.	00	_			Date Analyzed:	12/24/96	
GC Column:	DB-5		_ ID:	<u>0.25</u> (r	nm)	Dilution Factor:	1.0	
Soil Extract Vo	olume:		_(uL)			Soil Aliquot Volume:	(ıL)

CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	Q
67-64-1	acetone	110	
78-93-3	2-butanone	47	Ü
71-43-2	benzene	47	U
108-10-1	4-methyl-2-pentanone	47	Ü
108-88-3	toluene	47	U
100-41-4	ethylbenzene	47	U
108-38-3	m,p-xylene	94	U
95-47-6	o-xylene	47	Ú
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SAMPLE NO.

CI CC CP 11 6.0

Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GL-SS-G	B-116-8
Project No.:	09928.00.0	1	Site	GRINR'S LA	Location:	FREMONT, OHIO	Group:	
Matrix: (soil/	water)	SOIL	_			Lab Sample ID:	GB116-8	
Sample wt/vo	d:	5.3	(g/mL)	G		Lab File ID:	LUBV125.D	
Level: (low	/med)	LOW	-			Date Received:	12/19/96	
% Moisture:	not dec.	0	-			Date Analyzed:	12/26/96	
GC Column:	DB-5		_ ID:	0.25 (r	nm)	Dilution Factor:	1.0	
Soil Extract V	olume:		(uL)			Soil Aliquot Volume:		(uL)
					Concentrat	ion Units:		
CAS	5 N o.	Compound		(ug/L or ug/K	g) <u>ug/Kg</u>	Q	
67-0	64-1	acetone			T	47	U	

SAMPLE NO.

Lab Name: ERM-FAST Contract: LUBRIZOL

Project No.: 09928.00.01 Site: GRINR'S LA Location: FREMONT, OHIO Group:

 Matrix:
 (soil/water)
 SOIL
 Lab Sample ID: GB118-10

 Sample wt/vol:
 4.9 (g/mL) G
 Lab File ID: LUBV126.D

Level: (low/med) LOW Date Received: 12/19/96

% Moisture: not dec. 0 Date Analyzed: 12/26/96

GC Column: DB-5 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units: CAS No. Q Compound (ug/L or ug/Kg) ug/Kg 67-64-1 acetone 920 78-93-3 2-butanone 51 Ū 71-43-2 benzene 51 υ 108-10-1 4-methyl-2-pentanone 51 108-88-3 toluene 51 Ū 100-41-4 ethylbenzene 51 U 108-38-3 100 ΰ m,p-xylene 95-47-6 o-xylene 51 Ū

SAMPLE NO.

GL-WS-GB-11 Lab Name: ERM-FAST Contract: LUBRIZOL Site: GRINR'S LA Location: FREMONT, OHIO Project No.: 09928.00.01 Group: WATER Lab Sample ID: GB11 Matrix: (soil/water) 5.0 Sample wt/vol: (g·mL) ML Lab File ID: LUBV099.D Level: (low/med) Date Received: 12/19/96 100 % Moisture: not dec. Date Analyzed: 12/24/96 Dilution Factor: 1.0 GC Column: DB-5 ID: 0.25 (mm) Soil Aliquot Volume: (uL) Soil Extract Volume: (uL)

		Concentration Units:		
CAS No.	Compound	(ug/L or ug/Kg)	ug/L	Q
67-64-1	acetone	50		U
78-93-3	2-butanone	50		U
71-43-2	benzene	50	1	U
108-10-1	4-methyl-2-pentanone	50		U
108-88-3	toluene	50	1	U
100-41-4	ethylbenzene	50	1	U
108-38-3	m,p-xylene	100	1	U
95-47-6	o-xylene	50	· 	U
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Lab Name: ERM-FAST			Contract:	LUBRIZOL	GL-SS-GE	3-12 0-2'
Project No.: 09928.00.01		Site: GRINR'S LA	Location:	FREMONT, OHIO	Group: _	
Matrix: (soil/water)	SOIL			Lab Sample ID:	GB120-2	
Sample wt/vol:	5.0	(g/mL) <u>G</u>		Lab File ID:	LUBV105.D	
Level: (low/med)	LOW	•		Date Received:	12/19/96	
% Moisture: not dec.	0			Date Analyzed:	12/24/96	
GC Column: DB-5		ID: <u>0.25</u> (m	ım)	Dilution Factor:	1.0	
Soil Extract Volume:		(uL)		Soil Aliquot Volume:		(uL)
		•	Concentrat	ion Units:		

CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	Q
67-64-1	acetone	50	T U
78-93-3	2-butanone	50	U
71-43-2	benzene	50	U
108-10-1	4-methyl-2-pentanone	50	U
108-88-3	toluene	50	Ü
100-41-4	ethylbenzene	50	Ū
108-38-3	m,p-xylene	100	U
95-47-6	o-xylene	50	U
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SAMPLE NO.

GL-SS-GB-12 2-4

Lab Name:	ERM-FAST	·		Contract:	LUBRIZOL	GL-SS-GB-12 2-4
Project No.:	09928.00.01		Site: GRINR'S LA	Location:	FREMONT, OHIO	Group:
Matrix: (soil/	water)	SOIL	<u>-</u>		Lab Sample ID:	GB122-4
Sample wt/vo	d:	5.5	(g/mL) G		Lab File ID:	LUBV106.D
Level: (low	r/med)	LOW	_		Date Received:	12/19/96
% Moisture:	not dec.	0	_		Date Analyzed:	12/24/96
GC Column:	DB-5		ID:0.25(n	nm)	Dilution Factor:	1.0
Soil Extract V	olume:		_(uL)		Soil Aliquot Volume:	(uL)

act Volume:	(UL)	Soil Aliquot Volum	:				
		Concentration Units:					
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	Q				
67-64-1	acetone	45	U				
78-93-3	2-butanone	45	Ü				
71-43-2	benzene	45	U				
108-10-1	4-methyl-2-pentanone	45	U				
108-88-3	toluene	45	U				
100-41-4	ethylbenzene	45	Ü				
108-38-3	m,p-xylene	91	U				
95-47-6	o-xylene	45	U				
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Lab Name: ERM-FAST			Contract:	LUBRIZOL	GL-SS-GB-12 4-6
Project No.: 09928.00.0	1	Site: GRINR'S LA	Location:	FREMONT, OHIO	Group:
Matrix: (soil/water)	SOIL	_		Lab Sample ID:	GB124-6
Sample wt/vol:	5.3	(g/mL) G		Lab File ID:	LUBV107.D
Level: (low/med)	LOW	_		Date Received:	12/19/96
% Moisture: not dec.	0	<u> </u>		Date Analyzed:	12/24/96
GC Column: DB-5	-, · - · ·	ID: 0.25 (m	nm)	Dilution Factor:	1.0
Soil Extract Volume:		_(uL)		Soil Aliquot Volume:	(uL)

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	_
67-64-1	acetone	100	
78-93-3	2-butanone	47	U
71-43-2	benzene	47	Ū
108-10-1	4-methyl-2-pentanone	47	Ú
108-88-3	toluene	47	U
100-41-4	ethylbenzene	47	U
108-38-3	m,p-xylene	94	Ü
95-47-6	o-xylene	47	U
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SAMPLE NO.

GL-SS-GB-12 6-8' Lab Name: ERM-FAST Contract: LUBRIZOL Site: GRINR'S LA Location: FREMONT, OHIO Project No.: 09928.00.01 Group: Matrix: (soil/water) SOIL Lab Sample ID: GB126-8 Sample wt/vol: 6.5 (g:mL) G Lab File ID: LUBV108.D Level: (low/med) LOW Date Received: 12/19/96 % Moisture: not dec. 0 Date Analyzed: 12/24/96 GC Column: DB-5 ID: 0.25 (mm) Dilution Factor: 1.0 Soil Extract Volume: (uL) (uL) Soil Aliquot Volume:

Concentration Units:						
CAS No.	Compound	(ug/L or ug/Kg)	ug/Kg Q			
67-64-1	acetone	38	U			
78-93-3	2-butanone	38	U			
71-43-2	benzene	38	U			
108-10-1	4-methyl-2-pentanone	38	U			
108-88-3	toluene	38	U			
100-41-4	ethylbenzene	38	U			
108-38-3	m,p-xylene	77	U			
95-47-6	o-xylene	38	U			
						
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SAMPLE NO.

Lab Name: El	RM-FAST				Contract:	LUBRIZOL	GL-SS-GB-12 8-10
Project No.: 0	9928.00.01		Site:	GRINR'S LA	Location:	FREMONT, OHIO	Group:
Matrix: (soil/wa	ater) _	SOIL				Lab Sample ID:	GB128-10
Sample wt/vol:	_	5.1	(g/mL)	G		Lab File ID:	LUBV109.D
Level: (low/m	ned) _	LOW				Date Received:	12/19/96
% Moisture: no	ot dec.	0				Date Analyzed:	12/24/96
GC Column: D	B-5	· ··	ID:	0.25(r	nm)	Dilution Factor:	1.0
Soil Extract Volu	ume:		(uL)			Soil Aliquot Volume:	(uL)

CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	Q
67-64-1	acetone	4400	-
78-93-3	2-butanone	190	
71-43-2	benzene	49	U
108-10-1	4-methyl-2-pentanone	49	- -
108-88-3	toluene	49	-
100-41-4	ethylbenzene	49	U U
108-38-3	m,p-xylene	98	U
95-47-6	o-xylene	49	U
			

SAMPLE NO.

GL-WS-GB-12

Lab Name: ERM-FAST Contract: LUBRIZOL FREMONT, OHIO Project No.: 09928.00.01 Site: GRINR'S LA Location: Group: WATER Matrix: (soil/water) Lab Sample ID: GB12 5.0 Lab File ID: LUBV110.D Sample wt/vol: (g mL) ML Level: (low/med) Date Received: 12/19/96 Date Analyzed: 12/24/96 % Moisture: not dec. 100 Dilution Factor: 1.0 GC Column: DB-5 ID: 0.25 (mm) Soil Aliquot Volume: __ _ (uL) Soil Extract Volume: (uL)

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg)	ug/L Q
67-64-1	acetone	50	Ü
78-93-3	2-butanone	50	U
71-43-2	benzene	50	U
108-10-1	4-methyl-2-pentanone	50	Ū
108-88-3	toluene	50	U
100-41-4	ethylbenzene	50	U
108-38-3	m,p-xylene	100	U
95-47-6	o-xylene	50	U
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SAMPLE NO.

Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GL-WS-GB-12DUP
Project No.:	09928.00.01		Site:	GRINR'S LA	Location:	FREMONT, OHIO	Group:
Matrix: (soil/v	water)	WATER	_			Lab Sample ID:	GB12DUP
Sample wt/vo	l:	5.0	_(g/mL)	ML		Lab File ID:	LUBV111.D
Level: (low	/med)		_			Date Received:	12/19/96
% Moisture:	not dec.	100	_			Date Analyzed:	12/24/96
GC Column:	DB-5		ID:	<u>0.25</u> (m	ım)	Dilution Factor:	1.0
Soil Extract V	olume:		_ (uL)			Soil Aliquot Volume:	(uL)

CACAG	C	Concentration Units:	0
CAS No.	Compound	(ug/L or ug/Kg) ug/L	α
67-64-1	acetone	50	U
78-93-3	2-butanone	50	U
71-43-2	benzene	50	U
108-10-1	4-methyl-2-pentanone	50	U
108-88-3	toluene	50	U
100-41-4	ethylbenzene	50	U
108-38-3	m,p-xylene	100	U
95-47-6	o-xylene	50	U_
			
			
			
			

SAMPLE NO.

Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GL-SS-G	B-13 0-2
Project No.:	09928.00.0	1	Site: GR	INR'S LA	Location:	FREMONT, OHIO	Group:	
Matrix: (soil	l/water)	SOIL	_			Lab Sample ID:	GB130-2	
Sample wt/v	voi:	5.0	(g·mL)	G		Lab File ID:	LUBV114.D	
Level: (lo	w/med)	LOW	_			Date Received:	12/19/96	
% Moisture:	not dec.	0	_			Date Analyzed:	12/24/96	
GC Column:	DB-5		ID:	0.25 (m	nm)	Dilution Factor:	1.0	
Soil Extract	Volume:		_(uL)			Soil Aliquot Volume:		(uL)
					Concentrat			
CA	AS No.	Compound		((ug/L or ug/K	g) <u>ug/Kg</u>	a	
67	-64-1	acetone	-			50	U	
78	-93-3	2-butanone				50	U	
71	-43-2	benzene				50	U	
<u> </u>	8-10-1	4-methyl-2-	pentanone		<u> </u>	50	U	
		toluene			ļ	50	U	
		ethylbenzen	<u> </u>			50	U	
		m,p-xylene				100	U	
95	-47-6	o-xylene				50	U	
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Lab Name: <u>I</u>	ERM-FAST				Contract:	LUBRIZOL	GL-SS-GB-13 2	2-4*
Project No.:	09928.00.01		Site:	GRINR'S LA	Location:	FREMONT, OHIO	Group:	
Matrix: (soil/w	rater)	SOIL	_			Lab Sample ID:	GB132-4	
Sample wt/vol:	: <u> </u>	5.3	_(g/mL)	G		Lab File ID:	LUBV115.D	
Level: (low/r	med)	LOW	_			Date Received:	12/19/96	
% Moisture: r	not dec.	0	_			Date Analyzed:	12/24/96	
GC Column: 1	DB-5		ID:	0.25(m	nm)	Dilution Factor:	1.0	
Soil Extract Vol	lume: _		_ (uL)			Soil Aliquot Volume:	(uL)	

Concentration Units:						
CAS No.	Compound	(ug/L or ug/Kg)	ug/Kg	Q		
67-64-1	acetone	47		U		
78-93-3	2-butanone	47		U		
71-43-2	benzene	47		U		
108-10-1	4-methyl-2-pentanone	47		U		
108-88-3	toluene	47		U		
100-41-4	ethylbenzene	47		U		
108-38-3	m,p-xylene	94		U		
95-47-6	o-xylene	47		U		
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SAMPLE NO.

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Lab Name:	ERM-FAST	·			Contract:	LUBRIZOL	GL-SS-G	B-13 4-6
Project No.:	09928.00.0	1	Site:	GRINR'S LA	Location:	FREMONT, OHIO	Group:	
Matrix: (soil	/water)	SOIL	_			Lab Sample ID:	GB134-6	
Sample wt/v	ol:	5.6	(g mL)	G		Lab File ID:	LUBV116.D	
Level: (lov	w/med)	LOW	-			Date Received:	12/19/96	
% Moisture:	not dec.	0				Date Analyzed:	12/24/96	
GC Column:	DB-5		ID:	0.25(n	nm)	Dilution Factor:	1.0	
Soil Extract \	Volume:		(uL)			Soil Aliquot Volume:		(uL)
					Concentrat	ion Units:		
CA	S No.	Compound		(1	ug/L or ug/K	g) <u>ug/Kg</u>	Q	
67-	-64-1	acetone	-			50		
78-	-93-3	2-butanone				45	U	
71.	-43-2	benzene				45	U	
10	8-10-1	4-methyl-2-	pentanor	ne		45	U	
104	8-88-3	toluene				45	U	
100	0-41-4	ethylbenzen	e			45	U	
10	8-38-3	m,p-xylene				89	U	
95-	-4 7-6	o-xylene				45	U	
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Lab Name:	ERM-FAST		_		Contract:	LUBRIZOL	GL-SS-GB	-13 6-8'
Project No.:	09928.00.01		Site:	GRINR'S LA	Location:	FREMONT, OHIO	Group:	
Matrix: (soil/	water)	SOIL	_			Lab Sample ID:	GB136-8	
Sample wt/vo	J:	6.0	(g/mL)	G		Lab File ID:	LUBV117.D	
Level: (low	/med)	LOW	-			Date Received:	12/19/96	
% Moisture:	not dec.	0	-			Date Analyzed:	12/25/96	
GC Column:	DB-5		ID:	0.25 (n	nm)	Dilution Factor:	1.0	
Soil Extract V	olume:		_(uL)			Soil Aliquot Volume:		(uL)

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	Q
67-64-1	acetone	42	U
78-93-3	2-butanone	42	U
71-43-2	benzene	42	U
108-10-1	4-methyl-2-pentanone	42	U
108-88-3	toluene	42	U
100-41-4	ethylbenzene	42	U
108-38-3	m,p-xylene	83	U
95-47-6	o-xylene	42	U
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SAMPLE NO.

GL-SS-GB-13 8-10'

Lab Name: ERM-FAST		Contract: LUBRIZOL	<u> </u>	
Project No.: 09928.00.0	1 Site: GRINE	R'S LA Location: FREMONT	r, OHIO Group:	
Matrix: (soil/water)	SOIL	Lab	Sample ID: GB138-10	
Sample wt/vol:	5.0 (g'mL) G	<u>. </u>	Lab File ID: LUBV118.D	
Level: (low/med)	LOW	Dat	te Received: 12/19/96	
% Moisture: not dec.	0	Dat	te Analyzed: 12/25/96	
GC Column: DB-5	ID: 0.2	(mm) Dilu	rtion Factor: 1.0	
Soil Extract Volume:	(uL)	Soil Aliqu	uot Volume: (u	JL)

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	Q
57-64-1	acetone	4200	
78-93-3	2-butanone	110	
71-43-2	benzene	50	U
108-10-1	4-methyl-2-pentanone	50	U
108-88-3	toluene	50	U
100-41-4	ethylbenzene	50	U
108-38-3	m,p-xylene	100	U
95-47-6	o-xylene	50	U
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Lab Name:	ERM-FAST			Contract:	LUBRIZOL	G2-30-G5-10-10-12
Project No.:	09928.00.01		Site: GRINR'	SLA Location:	FREMONT, OHIO	Group:
Matrix: (soil/	water) _	SOIL	_		Lab Sample ID:	GB131012
Sample wt/vo	ol:	5.9	(g/mL) G		Lab File ID:	LUBV119.D
Level: (low	/med)	LOW	-		Date Received:	12/19/96
% Moisture:	not dec.	0	-		Date Analyzed:	12/25/96
GC Column:	DB-5		ID: 0.25	(mm)	Dilution Factor:	1.0
Soil Extract V	olume:		(uL)		Soil Aliquot Volume:	(uL)

		Concentration Unit	ts:	
CAS No.	Compound	(ug/L or ug/Kg)	ug/Kg_	Q
67-64-1	acetone		65	
78-93-3	2-butanone		42	U
71-43-2	benzene		42	ΰ
108-10-1	4-methyl-2-pentanone		39	
108-88-3	toluene		42	U
100-41-4	ethylbenzene	4	42	U
108-38-3	m,p-xylene	8	35	U
95-47-6	o-xylene		42	U
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Lab Name:	ERM-FAST				Contract:	LUBRIZOL	Gr-M2)-GB- I
Project No.:	09928.00.01		Site:	GRINR'S LA	Location:	FREMONT, OHIO	Group:	
Matrix: (soil/	water)	WATER	_			Lab Sample ID:	GB13	
Sample wt/vo	ol: _	5.0	(g mL)	ML		Lab File ID:	LUBV113.D	
Level: (low	r/med)		_			Date Received:	12/19/96_	
% Moisture:	not dec.	100				Date Analyzed:	12/24/96	
GC Column:	DB-5		ID:	0.25 (mm)	Dilution Factor:	1.0	
Soil Extract V	/olume:		(uL)			Soil Aliquot Volume:		(uL)
					Concentrat	tion Units:		
CAS	S No.	Compound			(ug/L or ug/K	g) <u>ug/L</u>	Q	
67-	64-1	acetone			T	50	U	
78-	93-3	2-butanone				50	U	
71-	43-2	benzene			1	50	U	
108	3-10-1	4-methyl-2-	pentanon	е		50	U	ĺ
		toluene				50	U	
		ethylbenzer	ie		1	50	U	
		m,p-xylene o-xylene				100 50	U	
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SAMPLE NO.

GL-SS-GB-14 0-2'

Lab Name: ERM-FAST			Contract:	LUBRIZOL	02 00 00 1.4 0 2
Project No.: 09928.00.0	1	Site: GRINR'S LA	Location:	FREMONT, OHIO	Group:
Matrix: (soil/water)	SOIL			Lab Sample ID:	GB140-2
Sample wt/vol:	4.9	(g/mL) G		Lab File ID:	LUBV127.D
Level: (low/med)	LOW			Date Received:	12/19/96
% Moisture: not dec.	0			Date Analyzed:	12/26/96
GC Column: DB-5		ID: 0.25 (m	m)	Dilution Factor:	1.0
Soil Extract Volume:		(uL)		Soil Aliquot Volume:	(uL)

		Concentration Units:		
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	. <u>a</u>	
67-64-1	acetone	51	U	
78-93-3	2-butanone	51	U	
71-43-2	benzene	51	U	
108-10-1	4-methyl-2-pentanone	51	U	
108-88-3	toluene	51	U	
100-41-4	ethylbenzene	51	U	
108-38-3	m,p-xylene	100	U	
95-47-6	o-xylene	51	U	
				
				
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Lab Name:	ERM-FAST			Contract:	LUBRIZOL	GL-SS-G	iB-14 2-4
Project No.:	09928.00.01	1	Site: GRINR'S LA	Location:	FREMONT, OHIO	Group:	
Matrix: (soil/v	water)	SOIL			Lab Sample ID:	GB142-4	
Sample wt/vol	l: _	5.1	(g/mL)G		Lab File ID:	LUBV128.D	
Level: (low/	/med)	LOW			Date Received:	12/19/96	
% Moisture:	not dec.	0			Date Analyzed:	12/26/96	
GC Column:	DB-5		JD: 0.25 (i	നന)	Dilution Factor:	1.0	
Soil Extract Vo	olume:		(uL)		Soil Aliquot Volume:		(uL)
				Concentrat	ion Units:		
CAS	No.	Compound	1	lug/L or ug/K	g) <u>ug/Kg</u>	Q	
67-6	34-1	acetone		1	49	U	
78-9	3-3	2-butanone			49	U	
71-4	13-2	benzene			49	U	
		4-methyl-2-	pentanone		49	U	
-		toluene			49	U	
		ethylbenzen	e	1	49	U	
		m,p-xylene			98	U	
95-4	37-6	o-xylene		 	49	U	1
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Lab Name: ERM-I	AST		Contract:	LUBRIZOL	GL-SS-GB-14 4-6
Project No.: 0992	3.00.01	Site: GRINR'S LA	Location:	FREMONT, OHIO	Group:
Matrix: (soil/water)	SOIL			Lab Sample ID:	GB144-6
Sample wt/vol:	5.3	(g/mL) <u>G</u>		Lab File ID:	LUBV129.D
Level: (low/med)	LOW	-		Date Received:	12/19/96
% Moisture: not de	ec. 0	_		Date Analyzed:	12/26/96
GC Column: DB-5		ID: 0.25 (m	ım)	Dilution Factor:	1.0
Soil Extract Volume:		(uL)		Soil Aliquot Volume:	(uL)
			Concentrat	tion Units:	

CAS No.	Compound	(ug/L or ug/Kg)	ug/Kg	a
67-64-1	acetone	9	4	
78-93-3	2-butanone	4	7	U
71-43-2	benzene	4	7	U
108-10-1	4-methyl-2-pentanone	4	7	U
108-88-3	toluene	4	7	U
100-41-4	ethylbenzene	4	7	U
108-38-3	m,p-xylene	9	4	U
95-47-6	o-xylene	4	7	U
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SAMPLE NO.

GL-SS-GB-14 6-8'

Lab Name:	ERM-FAST				Contract:	LUBRIZOL	02 00 0	2 14 0 0
Project No.:	09928.00.0	1	Site:	GRINR'S LA	Location:	FREMONT, OHIO	Group:	
Matrix: (soil/	water)	SOIL	_			Lab Sample ID:	GB146-8	
Sample wt/vo	.	5.4	(g mL)	G		Lab File ID:	LUBV154.D	
Level: (low	r∤med)	LOW	_			Date Received:	12/19/96	
% Moisture:	not dec.	0	_			Date Analyzed:	12/27/96	
GC Column:	DB-5		ID:	0.25(m	nm)	Dilution Factor:	1.0	
Soil Extract V	olume:		(uL)			Soil Aliquot Volume:		(uL)
					Concentrat	tion Units:		
CAS	S No.	Compound		(1	g/L or ug/K	g) ug/Kg	Q	

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	_
67-64-1	acetone	110	
78-93-3	2-butanone	46	U
71-43-2	benzene	46	U
108-10-1	4-methyl-2-pentanone	37	J
108-88-3	toluene	46	U
100-41-4	ethylbenzene	46	U
108-38-3	m,p-xylene	93	U
95-47-6	o-xylene	46	U
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SAMPLE NO.

GL-SS-GR-14 10-12'

Lab Name:	ERM-FAST			Contract:	LUBRIZOL	GE-53-GB-14 10-12
Project No.:	09928.00.01		Site: GRINR'S LA	Location:	FREMONT, OHIO	Group:
Matrix: (soil/	water)	SOIL	-		Lab Sample ID:	GB141012
Sample wt/vo	ol:	4.9	(g/mL) G		Lab File ID:	LUBV131.D
Level: (low	r/med}	LOW			Date Received:	12/19/96
% Moisture:	not dec.	0	•		Date Analyzed:	12/26/96
GC Column:	DB-5		ID: 0.25 (n	nm)	Dilution Factor:	1.0
Soil Extract V	olume:		(uL)		Soil Aliquot Volume:	(uL)

Concentration Units:

Concentration Units: . Compound (ug/L or ug/Kg) ug/Kg Q					
Compound	(ug/L or ug/Kg)	ug/Kg	. а		
acetone	130				
2-butanone	51		U		
benzene	51		U		
4-methyl-2-pentanone	51		Ü		
toluene	51		U		
ethylbenzene	51		U		
m,p-xylene	100		Ú		
o-xylene	. 51		U		
					
					
	acetone 2-butanone benzene 4-methyl-2-pentanone toluene ethylbenzene m,p-xylene	acetone 130 2-butanone 51 benzene 51 4-methyl-2-pentanone 51 toluene 51 ethylbenzene 51 m,p-xylene 100	acetone		

Lab Nan	ne:	ERM-FAST				Contract:	LUBRIZOL	GL-WS	6-GB-14
Project I	No.:	09928.00.01	!	Site:	GRINR'S LA	A Location:	FREMONT, OHIO	Group:	
Matnx:	(soil/	water)	WATER	_			Lab Sample ID:	GB14	
Sample	wt.∜va	d:	5.0	(g/mL)	ML		Lab File ID:	LUBV120.D	
Level:	(low	/med)		_			Date Received:	12/19/96	
% Moist	ture:	not dec.	100				Date Analyzed:	12/25/96	
GC Colu	mn:	DB-5		ID:	0.25	(mm)	Dilution Factor:	1.0	
Soil Extr	ract V	olume:		(uL)			Soil Aliquot Volume:		(uL)
						Concentrat	tion Units:		
	CAS	S No.	Compound			(ug/L or ug/K	g) <u>ug/L</u>	Q	
	67-0	64-1	acetone				50	U	
	78-9	93-3	2-butanone		-	T	50	U	
	71-	43-2	benzene				50	U	
			4-methyl-2-	pentanor	ne		50	U	
			toluene				50	U	
			ethylbenzen	e			50	U	
			m,p-xylene				100	U	
	95-	47-6	o-xylene				50	U	
									
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Lab Name: ERM-FAST			Contract:	LUBRIZOL	GL-SS-GB-15 0-2
Project No.: 09928.00.0	1	Site: GRINR'S LA	Location:	FREMONT, OHIO	Group:
Matrix: (soil/water)	SOIL	_		Lab Sample ID:	GB150-2
Sample wt/vol:	5.4	(g/mL) <u>G</u>		Lab File ID:	LUBV133.D
Level: (low/med)	LOW			Date Received:	12/19/96
% Moisture: not dec.	0	_		Date Analyzed:	12/26/96
GC Column: DB-5		ID: 0.25 (m	ım)	Dilution Factor:	1.0
Soil Extract Volume:		_ (uL)		Soil Aliquot Volume:	(uL)

Concentration Units:

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	_
67-64-1	acetone	42	J
78-93-3	2-butanone	46	U
71-43-2	benzene	46	U
108-10-1	4-methyl-2-pentanone	46	U
108-88-3	toluene	46	U
100-41-4	ethylbenzene	46	U
108-38-3	m,p-xylene	93	υ
95-47-6	o-xylene	46	U
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FORM I VOA

SAMPLE NO.

GL-SS-GB-15 2-4'

Lab Name:	ERM-FAST			Contract:	LUBRIZOL	GL-55-GB-15 2-4
Project No.:	09928.00.01		Site: GRINR	S LA Location:	FREMONT, OHIO	Group:
Matrix: (soil/s	water) _	SOIL	_		Lab Sample ID:	GB152-4
Sample wt/vo	l: _	5.4	_(g mL)G		Lab File ID:	LUBV153.D
Level: (low	/med) _	LOW	_		Date Received:	12/19/96
% Moisture:	not dec	0	-		Date Analyzed:	12/27/96
GC Column:	DB-5		ID: 0.2	5 (mm)	Dilution Factor:	1.0
Soil Extract V	olume: _	.	_ (uL)		Soil Aliquot Volume:	(uL)

Concentration Units:

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	Q
67-64-1	acetone	140	
78-93-3	2-butanone	46	U
71-43-2	benzene	46	U
108-10-1	4-methyl-2-pentanone	220	
108-88-3	toluene	46	U
100-41-4	ethylbenzene	46	U
108-38-3	m,p-xylene	93	U
95-47-6	o-xylene	46	Ü
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SAMPLE NO.

GL-SS-GB-15 4-6

Lab Name: ERM-FAST			Contract:	LUBRIZOL	<u></u>
Project No.: 09928.00.01		Site: GRINR'S LA	Location:	FREMONT, OHIO	Group:
Matrix: (soil/water)	SOIL	_		Lab Sample ID:	GB154-6
Sample wt/vol:	5.5	(g/mL) <u>G</u>		Lab File ID:	LUBV135.D
Level: (low/med)	LOW	_		Date Received:	12/19/96
% Moisture: not dec.	0	_		Date Analyzed:	12/26/96
GC Column: DB-5		ID: <u>0.25</u> (m	m)	Dilution Factor:	1.0
Soil Extract Volume:		_(uL)		Soil Aliquot Volume:	(uL)

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	Q
67-64-1	acetone	9100	
78-93-3	2-butanone	130	
71-43-2	benzene	85	T
108-10-1	4-methyl-2-pentanone	45	U
108-88-3	toluene	45	U
100-41-4	ethylbenzene	45	U
108-38-3	m,p-xylene	91	U
95-47-6	o-xylene	45	U
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SAMPLE NO.

GL-SS-GB-15 6-8

Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GL-33-G	B-13 0-0
Project No.:	09928.00.0	1	Site:	GRINR'S	LA Location:	FREMONT, OHIO	Group:	
Matrix: (soil/w	rater)	SOIL				Lab Sample ID:	GB156-8	
Sample wt/vol:	: .	5.0	(g mL)	G	_	Lab File ID:	LUBV136.D	
Level: (low/	med)	LOW				Date Received:	12/19/96	
% Moisture:	not dec.	0				Date Analyzed:	12/26/96	
GC Column:	DB-5		ID:	0.25	_ (mm)	Dilution Factor:	1.0	
Soil Extract Vo	olume:		(uL)			Soil Aliquot Volume:		(uL)
CAS	No.	Compound			Concentrat (ug/L or ug/K		a	

S7-64-1 acetone			Concentration of	ms.	
78-93-3 2-butanone 130 71-43-2 benzene 43 J 108-10-1 4-methyl-2-pentanone 50 U 108-88-3 toluene 50 U 100-41-4 ethylbenzene 50 U 108-38-3 m,p-xylene 100 U	CAS No.	Compound	(ug/L or ug/Kg)	<u>ug/Kg</u>	a
71-43-2 benzene 43 J 108-10-1 4-methyl-2-pentanone 50 U 108-88-3 toluene 50 U 100-41-4 ethylbenzene 50 U 108-38-3 m,p-xylene 100 U	67-64-1	acetone	82	200	
108-10-1 4-methyl-2-pentanone 50 U 108-88-3 toluene 50 U 100-41-4 ethylbenzene 50 U 108-38-3 m,p-xylene 100 U	78-93-3	2-butanone		130	
108-88-3 toluene 50 U 100-41-4 ethylbenzene 50 U 108-38-3 m,p-xylene 100 U	71-43-2	benzene		43	J
108-88-3 toluene 50 U 100-41-4 ethylbenzene 50 U 108-38-3 m,p-xylene 100 U	108-10-1	4-methyl-2-pentanone		50	U
108-38-3 m,p-xylene 100 U	108-88-3			50	U
108-38-3 m,p-xylene 100 U	100-41-4	ethylbenzene		50	U
	108-38-3			100	U
	95-47-6			50	U
					
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SAMPLE NO.

GL-SS-GB-15 8-10

Lab Name: ERM-FAST			Contract:	LUBRIZOL	
Project No.: 09928.00.01]	Site: GRINR'S LA	Location:	FREMONT, OHIO	Group:
Matrix: (soil/water)	SOIL	_		Lab Sample ID:	GB158-10
Sample wt/vol:	5.1	_(g/mL)G		Lab File ID:	LUBV137.D
Level: (low/med)	LOW			Date Received:	12/19/96
% Moisture: not dec.	0			Date Analyzed:	12/26/96
GC Column: DB-5		ID: 0.25 (mm)	Dilution Factor:	1.0
Soil Extract Volume:		_ (uL)		Soil Aliquot Volume:	(uL)

Concentration Units:

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	. <u>Q</u>
67-64-1	acetone	30000	
78-93-3	2-butanone	420	
71-43-2	benzene	49	U
108-10-1	4-methyl-2-pentanone	2500	
108-88-3	toluene	49	Ü
100-41-4	ethylbenzene	49	U
108-38-3	m,p-xylene	98	U
95-47-6	o-xylene	49	U
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Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GL-WS	-GB-15
Project No.:	09928.00.01		Site:	GRINR'S LA	Location:	FREMONT, OHIO	Group:	
Matrix: (soil/	water)	WATER	_			Lab Sample ID:	GB15	
Sample wt/vo	ol:	5.0	(g 'mL)	ML		Lab File ID:	LUBV132.D	
.evel: (low	r/med)		_			Date Received:	12/19/96	
% Moisture:	not dec.	100	=			Date Analyzed:	12/26/96_	
GC Column:	DB-5		ID:	0.25 (n	nm)	Dilution Factor:	1.0	
Soil Extract V	/olume:		_(uL)			Soil Aliquot Volume:		(uL)
					Concentrat	tion Units:		

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/L	<u> </u>
67-64-1	acetone	50	U
78-93-3	2-butanone	50	U
71-43-2	benzene	50	U
108-10-1	4-methyl-2-pentanone	50	U
108-88-3	toluene	50	Ü
100-41-4	ethylbenzene	50	U
108-38-3	m,p-xylene	100	U
95-47-6	o-xylene	50	U
			

Lab Name: ERM-FAST		Contract: LUBRIZOL	GL-SS-GB-16 0-2'
Project No.: 09928.00.	01 Site: GRINR'S L	A Location: FREMONT, OHIO	Group:
Matrix: (soil/water)	SOIL	Lab Sample ID:	GB1602
Sample wt/vol:	4.7 (g/mL) G	Lab File ID	LUBV140.D
Level: (low/med)	LOW	Date Received	12/20/96
% Moisture: not dec.	0	Date Analyzed	12/26/96
GC Column: DB-5	ID: 0.25	(mm) Dilution Factor	1.0
Soil Extract Volume:	(uL)	Soil Aliquot Volume	: (uL)
242		Concentration Units:	•
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	Q
67-64-1	acetone	53	U
78-93-3	2-butanone	53	U
71-43-2	benzene	53	U
108-10-1	4-methyl-2-pentanone	53	U
108-88-3	toluene	53	U
100-41-4	ethylbenzene	53	U
108-38-3	m,p-xylene	110	U
95-47-6	o-xylene	53	
			
			
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Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GL-SS-GB-16 2-4'
Project No.:	09928.00.01		Site:	GRINR'S LA	Location:	FREMONT, OHIO	Group:
Matrix: (soil/	water) _	SOIL	_			Lab Sample ID:	GB162-4
Sample wt/vo	d: _	4.8	_ (g :mL)	G		Lab File ID:	LUBV141.D
Level: (low	/med)	LOW	_			Date Received:	12/20/96
% Moisture:	not dec.	0	_			Date Analyzed:	12/26/96
GC Column:	DB-5		ID:	0.25 (n	nm)	Dilution Factor:	1.0
Soil Extract V	olume:		(uL)			Soil Aliquot Volume:	(uL)

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	Q
67-64-1	acetone	52	U
78-93-3	2-butanone	52	U
71-43-2	benzene	52	U
108-10-1	4-methyl-2-pentanone	52	U
108-88-3	toluene	52	U
100-41-4	ethylbenzene	52	U
108-38-3	m,p-xylene	100	U
95-47-6	o-xylene	52	U
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SAMPLE NO.

GL-SS-GB-16 4-6'

Lab Name: ERM-FAST		Contract:	LUBRIZOL	L
Project No.: 09928.00.0	1 Site: GRINR'S L	A Location:	FREMONT, OHIO	Group:
Matrix: (soil/water)	SOIL		Lab Sample ID:	GB164-6
Sample wt/vol:	5.3 (g/mL) G		Lab File ID:	LUBV156.D
Level: (low/med)	LOW		Date Received:	12/20/96
% Moisture: not dec.	0		Date Analyzed:	12/27/96
GC Column: DB-5	ID: 0.25	(mm)	Dilution Factor:	1.0
Soil Extract Volume:	(uL)		Soil Aliquot Volume:	(uL)

Concentration Units:

		 Concentration Units: 	
CAS No.	Compound	(ug/L or ug/Kg) u	ıg/Kg Q
67-64-1	acetone	140	
78-93-3	2-butanone	47	U
71-43-2	benzene	47	U
108-10-1	4-methyl-2-pentanone	47	U
108-88-3	toluene	47	U
100-41-4	ethylbenzene	47	U
108-38-3	m,p-xylene	94	U
95-47-6	o-xylene	47	υ
			
			
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FORM I VOA

SAMPLE NO.

GL-SS-GB-16 6-8'

Lab Name:	ERM-FAST				Contract:	LUBRIZOL	
Project No.:	09928.00.01		Site	GRINR'S LA	Location:	FREMONT, OHIO	Group:
Matrix: (soil/	water)	SOIL	_			Lab Sample ID:	GB166-8
Sample wt/vo	H:	5.3	_(g:mL)	G		Lab File ID:	LUBV143.D
Level: (low	/med)	LOW	_			Date Received:	12/20/96
% Moisture:	not dec.	0	_			Date Analyzed:	12/27/96
GC Column:	DB-5		_ ID:	<u> </u>	mm)	Dilution Factor:	1.0
Soil Extract V	olume:		_ (uL)			Soil Aliquot Volume:	(uL)
					Concentrat	tion Unite:	

	Concentration Units:	
Compound	(ug/L or ug/Kg) ug/K	<u>g</u> 0
acetone	780	
2-butanone	43	J
benzene	36	J
4-methyl-2-pentanone	3300	
toluene	47	U
ethylbenzene	47	U
	94	U
o-xylene	47	U
	<u> </u>	
<u></u>		
	acetone 2-butanone benzene 4-methyl-2-pentanone toluene ethylbenzene m,p-xylene	Compound (ug/L or ug/Kg) ug/Kg acetone 780 2-butanone 43 benzene 36 4-methyl-2-pentanone 3300 toluene 47 ethylbenzene 47 m,p-xylene 94

SAMPLE NO.

GL-SS-GB-16 8-10'

Lab Name: ERM-FAST			Contract:	LUBRIZOL	
Project No.: 09928.00.01		Site: GRINR'S LA	Location:	FREMONT, OHIO	Group:
Matrix: (soil/water)	SOIL			Lab Sample ID:	GB168-10
Sample wt/vol:	4.9	(g/mL) <u>G</u>		Lab File ID:	LUBV159.D
Level: (low/med)	LOW			Date Received:	12/20/96
% Moisture: not dec.	0			Date Analyzed:	12/27/96
GC Column: DB-5		ID: <u>0.25</u> (m	m)	Dilution Factor:	1.0
Soil Extract Volume:	- 	(uL)		Soil Aliquot Volume:	(uL)

Concentration Units:

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	Q
67-64-1	acetone	610	
78-93-3	2-butanone	140	7
71-43-2	benzene	51	U
108-10-1	4-methyl-2-pentanone	6000	
108-88-3	toluene	51	U
100-41-4	ethylbenzene	51	U
108-38-3	m,p-xylene	100	U
95-47-6	o-xylene	51	U
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SAMPLE NO.

GL-SS-GB-17 0-2' Lab Name: ERM-FAST Contract: LUBRIZOL Group: Project No.: 09928.00.01 Site: GRINR'S LA Location: FREMONT, OHIO SOIL Matrix: (soil/water) Lab Sample ID: GB170-2 4.9 Sample wt/vol: (g/mL) G Lab File ID: LUBV145.D Date Received: 12/20/96 Level: (low/med) LOW % Moisture: not dec. 0 Date Analyzed: 12/27/96 GC Column: DB-5 ID: 0.25 (mm) Dilution Factor: 1.0 Soil Aliquot Volume: (uL) (uL) Soil Extract Volume:

Conservation Haites

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	Q
67-64-1	acetone	51	U
78-93-3	2-butanone	51	U
71-43-2	benzene	51	U
108-10-1	4-methyl-2-pentanone	51	U
108-88-3	toluene	51	U
100-41-4	ethylbenzene	51	U
108-38-3	m,p-xylene	100	U
95-47-6	o-xylene	51	U
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SAMPLE NO

GL-SS-GB-17 2-4

Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GL-33-00	
Project No.:	09928.00.01		Site:	GRINR'S LA	Location:	FREMONT, OHIO	Group: _	_
Matrix: (soil/	water) _	SOIL				Lab Sample ID:	GB172-4	
Sample wt/vo	ol:	5.6	(g/mL)	G		Lab File ID:	LUBV146.D	
Level: (low	r/med)	LOW				Date Received:	12/20/96	
% Moisture:	not dec.	00				Date Analyzed:	12/27/96	
GC Column:	DB-5		ID:	0.25(m	nm)	Dilution Factor:	1.0	
Soil Extract V	olume:		(uL)			Soil Aliquot Volume:		(uL)

Concentration Units

	Concentration Units:		
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	a
67-64-1	acetone	45	T U T
78-93-3	2-butanone	45	U
71-43-2	benzene	45	U
108-10-1	4-methyl-2-pentanone	45	U
108-88-3	toluene	45	U
100-41-4	ethylbenzene	45	U
108-38-3	m,p-xylene	89	U
95-47-6	o-xylene	45	U
			
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FORM I VOA

SAMPLE NO.

21 -SS-GR-17 4-6

Lab Name: <u>ERM</u>	1-FAST		Contract:	LUBRIZOL	GE 00 GD 1	
Project No.: 099	28.00.01	Site: GRINR'S LA	Location:	FREMONT, OHIO	Group:	
Matrix: (soil/wate	r) SOIL	_		Lab Sample ID:	GB174-6	
Sample wt/vol:	5.1	_ (g mL) G		Lab File ID:	LUBV151.D	
Level: (low/med) LOW	_		Date Received:	12/20/96	
% Moisture: not	dec0	_		Date Analyzed:	12/27/96	
GC Column: DB-	5	ID: <u>0.25</u> (m	nm)	Dilution Factor:	1.0	
Soil Extract Volum	e:	_ (uL)		Soil Aliquot Volume:	(uL)
			Concentrat	ion Units:		

		Concentration Units:		
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	. a	
67-64-1	acetone	49	T U	
78-93-3	2-butanone	49	U	
71-43-2	benzene	49	Ū	
108-10-1	4-methyl-2-pentanone	49	U	
108-88-3	toluene	49	U	
100-41-4	ethylbenzene	49	U	
108-38-3	m,p-xylene	98	U	
95-47-6	o-xylene	49	U	
				
				
				
				
				
				
				
				
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SAMPLE NO

GL-SS-GB-17 6-8

Lab Name:	ERM-FAST			Contract:	LUBRIZOL	GL-33-GB-17 0-0
Project No.:	09928.00.01		Site: GRINR'S LA	Location:	FREMONT, OHIO	Group:
Matrix: (soil/	water) _	SOIL	-		Lab Sample ID:	GB176-8
Sample wt/vo	l: _	4.9	(g/mL) G		Lab File ID:	LUBV157.D
Level: (low	/med)	LOW	-		Date Received:	12/20/96
% Moisture:	not dec.	00	-		Date Analyzed:	12/27/96
GC Column:	DB-5		ID: 0.25 (m	m)	Dilution Factor:	1.0
Soil Extract V	olume:		· (uL)		Soil Aliquot Volume:	(uL)

Concentration Units

	Concentration Units:				
Compound	(ug/L or ug/Kg)	ug/Kg	ב		
acetone	54				
2-butanone	51		J		
benzene	51		J		
4-methyl-2-pentanone	51		J		
toluene	51		U		
ethylbenzene	51		j		
	100		J		
o-xylene	51		J		
	acetone 2-butanone benzene 4-methyl-2-pentanone toluene ethylbenzene m,p-xylene	Compound (ug/L or ug/Kg) acetone 54 2-butanone 51 benzene 51 4-methyl-2-pentanone 51 toluene 51 ethylbenzene 51 m,p-xylene 100	Compound (ug/L or ug/Kg) ug/Kg acetone 54 2-butanone 51 benzene 51 4-methyl-2-pentanone 51 toluene 51 ethylbenzene 51 m,p-xylene 100		

ERM-FAST SVOC Data

Lab Name: ERM	I-FAST		Contract:	LUBRIZOL	GL-SS-GB-1 0-2	•
Project No.: 099	28.00.01	Site: GRINRS LAG	Location:	FREMONT, OH	Group:	
Matrix: (soil/water				Lab Sample ID:		
Sample wt/vol:	10.0	(g/mL) G		•	LUB012.D	
Level: (low/med	 -			Date Received:		
% Moisture:		decanted: (Y/N):	N	Date Extracted:		
Concentrated Extra		1000 (uL)		Date Analyzed:		
				Dilution Factor:		
Injection Volume:	1.0	(uL)	7	Dilution Factor.		
GPC Cleanup: (Y/N	NN	. рн:	7 Canaantaat	i am I Imita		
CAS No.	Compound	(1	Concentrat ug/L or ug/K		Q	
108-95-2			3,	1000	U	
95-50-1	1,2-Dichloro	henzene		1000	- 0	
95-48-7	2-Methylphe		L	1000	Ü	
106-44-5				1000	- - - - - - - - -	
78-59-1	Isophorone	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	 _	1000	Ü	
120-82-1		probenzene		1000	Ū	
91-20-3	Naphthalene			1000	U	
91-57-6	2-Methylnar			1000	Ü	
86-73-7	Fluorene	With dictio		1000	Ü	
117-81-7		exyl)phthalate		1000	Ü	
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SAMPLE NQ.

							GL-SS-C	3B-1 2-4
Lab Name:	ERM-FAST				Contract:	LUBRIZOL		
Project No.	09928.00.0	1	Site:	GRINES LAG	Location:	FREMONT, OH	Group:	
Matrix: (so	oil-water)	SOIL	-			Lab Sample ID:	GB12-4	
Sample wt	vol:	10.0	ig mu	<u>G</u>		Lab File ID:	LUB013.D	
Level: 40	ow med)	LOW	_			Date Received:	12/16/96	
∾ Moisture	e: 0		de	canted: (Y N):	N	Date Extracted:	12/16/96	
Concentrate	ed Extract Volur	ne:	1000	(uL)		Date Analyzed:	12/16/96	
Injection Vo	olume:	1.0	(uL)	-		Dilution Factor:	1.0	
GPC Cleanu	up: (Y/N)		-	pH:	7			
			-		Concentrat	ion Units:		
C	CAS No.	Compound		(1	ug/Lorug/K		Q	
_	08-95-2	Phenol			I	1000	U	1
-	08-95-2 05-50-1	1,2-Dichlore	hanzana			1000		
-	5-48-7	2-Methylph				1000	- U	
<u> </u>	06-44-5	4-Methylph				1000	l ü	
_	8-59-1	Isophorone			-	1000	Ü	
-	20-82-1	1.2.4-Trichl	orobenze	ne .		1000	Ü	
·	1-20-3	Naphthalen				1000	Ü	
-	1-57-6	2-Methylna		2		1000	- ŭ	
_	6-73-7	Fluorene				1000	U	
	17-81-7	bis(2-Ethylh	exyliphth	nalate		1000	Ü	
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							GL-SS-GB-1	4-6'
Lab Name:	ERM-FAST				Contract:	LUBRIZOL		
Project No.:	09928.00.0	1	Site:	GRINRS LAG	Location:	FREMONT, OH	Group:	
Matrix: (soil/v	water)	SOIL				Lab Sample ID:	GB14-6	
Sample wt/vo	l:	10.0	(g/mL)	G		Lab File ID:	LUB014.D	
Level: (low)	/med)	LOW				Date Received:	12/16/96	
% Moisture:	0		de	canted: (Y/N):	N	Date Extracted:	12/16/96	
Concentrated	Extract Volun	ne:	1000	(uL)		Date Analyzed:	12/16/96	
Injection Volum	me:	1.0	(uL)			Dilution Factor:	1.0	
GPC Cleanup:	(Y/N)	N		рН:	7		•	
				,	Concentrat	ion Units:		
		Compound		((ug/L or ug/K	g) <u>ug/Kg</u>	Ω	
		Phenol				1000	U	
95-5		1,2-Dichloro	benzene			1000	U	
95-4	1 8-7	2-Methylphe	noi			1000	U	
106	-44-5	4-Methylphe	nol			1000	· U	
78-5	59-1	Isophorone				1000	U	
120	-82-1	1,2,4-Trichle	robenze	ne		1000	U	
91-2	20-3	Naphthalene				1000	υ	
91-5	57-6	2-Methylnap	hthalene	;		1000	U	
		Fluorene				1000	U	
117	-81-7	bis(2-Ethylhe	xyl)phth	nalate		480	JB	
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SAMPLE NO.

GL-SS-GB-1 6-8'

Lab Name: ERM-FAST		Contract:	LUBRIZOL	
Project No.: 09928.00.0	21	Site: GRINRS LAG Location:	FREMONT, OH	Group:
Matrix: (soil water)	SOIL	_	Lab Sample ID:	GB16-8
Sample wt vol:	10.0	(g mL) <u>G</u>	Lab File ID:	LUB015.D
Level: (low med)	LOW	_	Date Received:	12/16/96
% Moisture: 0	_	decanted: (Y N): N	Date Extracted:	12/16/96
Concentrated Extract Volu	me:	1000 (uL)	Date Analyzed:	12/16/96
Injection Volume:	1.0	_(uL)	Dilution Factor:	1.0
GPC Cleanup: (Y/N)	N	pH: 7		
		C	a' 11-ia	

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	a
108-95-2	Phenol	1000	U
95-50-1	1,2-Dichlorobenzene	1000	U
95-48-7	2-Methylphenol	1000	U
106-44-5	4-Methylphenol	1000	U
78-59-1	Isophorone	1000	U
120-82-1	1,2,4-Trichlorobenzene	1000	U
91-20-3	Naphthalene	1000	U
91-57-6	2-Methylnaphthalene	1000	U
86-73-7	Fluorene	1000	U
117-81-7	bis(2-Ethylhexyl)phthalate	1000	U
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						GL-SS-G	B-1 8-10'
	ERM-FAST			Contract:	LUBRIZOL		
Project No.:	09928.00.0	1	Site: GRINRS LAG	Location:	FREMONT, OH	Group:	
Matrix: (soil/	water)	SOIL			Lab Sample ID:	GB18-10	
Sample wt/vo	ol:	10.0	(g/mL) G		Lab File ID:	LUB016.D	
Level: (low	/med)	LOW			Date Received:	12/16/96	
% Moisture:	0		decanted: (Y/N):	N	Date Extracted:	12/16/96_	
Concentrated	Extract Volum	ne:	1000 (uL)		Date Analyzed:	12/16/96	
Injection Volu	me:	1.0	(uL)		Dilution Factor:	1.0	
GPC Cleanup:	(Y/N)	N	pH:	7			
				Concentrat			
	S No.	Compound		ug/L or ug/K	g) <u>ug/Kg</u>	<u> </u>	
<u> </u>	3-95-2	Phenol			790	J	
	50-1	1,2-Dichloro			1000	U	•
	48-7	2-Methylphe			1000	U	
	6-44-5	4-Methylphe	nol		1000	U	
78-	59-1	Isophorone			1000	U	
	0-82-1	1,2,4-Trichle	orobenzene	. <u>.</u> .	1000	U	
91-	20-3	Naphthalene			1000	U	
91-	57-6	2-Methylnap	hthalene		1000	U	
86-	73-7	Fluorene			1000	U	
117	7-81-7	bis(2-Ethylhe	exyl)phthalate		1000	υ	
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Lab Name:	ERM-FAST			Contract:	LUBRIZOL	GL-WS-GB-1	
Project No.:	09928.00.0	1	Site: GRINFS LAG	Location:	FREMONT, OH	Group:	
Matrix. (soil	water)	WATER			Lab Sample ID:	WSGB1	
Sample wt v	rol:	250 0	g mLi ML		Lab File ID:	LUB020.D	
Level (lov	w med)				Date Received:	12/16/96	
% Moisture:	100		decanted: (Y N)	. <u>N</u>	Date Extracted:	12/16/96	
Concentrate	d Extract Volum	ne: _	1000 (uL)		Date Analyzed:	12/17/96	
Injection Vol	ume:	1.0	uL)		Dilution Factor:	1.0	
GPC Cleanus	o: (Y N)	N	Нα				
CA	AS No.	Compound		Concentratiug L or ug/K		Q	
		Phenoi		1	100		
		1,2-Dichlorob	90.7000	+	100	 	
		2-Methylphen		 	100	- ŭ	
		4-Methylphen		 	100	l .	
		Isophorone		 	100	Ü	
—		1,2,4-Trichlor	obenzene	 	100	U	
91	-20-3	Naphthalene		1	100	U	
91	-57-6	2-Methylnaph	thalene		100	U	
86	-73-7	Fluorene			100	U	
11	7-81-7	bis(2-Ethylhex	yl)phthalate		100	Ü	
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Lab Name				Contract:	LUBRIZOL		
Project No	o.: <u>09928.00.0</u>	21	Site: GRINRS LAG	Location:	FREMONT, OH	Group: _	
Matrix: (s	soil/water)	SOIL			Lab Sample ID:	GB20-2	
Sample w	rt/vol:	10.0	(g/mL) G		Lab File ID:	LUB024.D	
Level:	(low/med)	LOW			Date Received:	12/16/96	
% Moistu	re: 0	-	decanted: (Y/N):	N	Date Extracted:	12/16/96	
Concentra	ited Extract Volur	ne:	1000 (uL)		Date Analyzed:	12/17/96	
Injection \	/olume:	1.0	(uL)		Dilution Factor:	1.0	
GPC Clear	nup: (Y/N)	N	pH:	7			
				Concentrat	ion Units:		
	CAS No.	Compound	((ug/L or ug/Ko	g) <u>ug/Kg</u>	a	
	108-95-2	Phenol			1000	U	
[95-50-1	1,2-Dichloro	benzene		1000	U	
	95-48-7	2-Methylphe	nol		1000	U	
	106-44-5	4-Methylphe	nol		1000	U	
	78-59-1	Isophorone			1000	U	
	120-82-1	1,2,4-Trichle	orobenzene		1000	U	
	91-20-3	Naphthalene			1000	υ	
i	91-57-6	2-Methylnap	hthalene		1000	U	
	86-73-7	Fluorene			1000	U	•
	117-81-7	bis(2-Ethylho	exyl)phthalate		580	J	
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SAMPLE NO.

GL-SS-GB-2 2-4

Lab Name:	ERM-FAST			Contract:	LUBRIZOL	
Project No.:	09928.00.01		Site: GRINRS LAG	Location:	FREMONT, OH	Group:
Matrix: (soil	water)	SOIL	_		Lab Sample ID:	GB22-4
Sample wt/vo	:k	10.0	ig mL) <u>G</u>		Lab File ID:	LUB025.D
Level: flow	med)	LOW	_		Date Received:	12/16/96
% Moisture:	0		decanted: (Y.N):	N	Date Extracted:	12/16/96_
Concentrated	Extract Volume	: :	1000 (uL)		Date Analyzed:	12/17/96
Injection Volu	me:	1.0	_(uL)		Dilution Factor:	1.0
GPC Cleanup:	(Y/N)	N	pH:	7		
				Concentrat	ion Units:	

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	_
108-95-2	Phenoi	1000	υ
95-50-1	1,2-Dichlorobenzene	1000	υ
95-48-7	2-Methylphenol	1000	U
106-44-5	4-Methylphenol	1000	U
78-59-1	Isophorone	1000	U
120-82-1	1,2,4-Trichlorobenzene	1000	υ
91-20-3	Naphthalene	1000	υ
91-57-6	2-Methylnaphthalene	1000	U
86-73-7	Fluorene	1000	U
117-81-7	bis(2-Ethylhexyl)phthalate	610	J
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		0.2	WOLATILE ONGAN	CO AMALIO	o DATA ONLL	GI -89-0	3B-2 4-6'
Lab Name:	ERM-FAST			Contract:	LUBRIZOL	GL-55-C	15-2 4-0
Project No.:	09928.00.0	1	Site: GRINRS LAG	Location:	FREMONT, OH	Group:	
Matrix: (soil	/water)	SOIL	_		Lab Sample ID:	GB24-6	
Sample wt/v	ol:	10.0	(g/mL) G		Lab File ID:	LUB027.D	
Level: (lov	v/med)	LOW	_		Date Received:	12/16/96	
% Moisture:	0		decanted: (Y/N)	: <u>N</u>	Date Extracted:	12/16/96	
Concentrated	d Extract Volun	ne:	1000 (uL)		Date Analyzed:	12/17/96	•
Injection Vol	ume:	1.0	(uL)		Dilution Factor:	1.0	
GPC Cleanup	o: (Y/N)	N	рН	:7	•		
				Concentrat			
		Compound		(ug/L or ug/K	g) <u>ug/Kg</u>	<u> </u>	
		Phenol		<u> </u>	1000	υ	
	-50-1	1,2-Dichloro		ļ	1000	U	
	-48-7	2-Methylphe		 	1000	. U	•
		4-Methylphe	enol	 	1000	U	
	-59-1 0-82-1	Isophorone 1,2,4-Trichl	orobonzono	 	1000	U	
		Naphthalene		 	1000	U	
	-57-6	2-Methylnar		 	1000	U	
		Fluorene	Jiti Idielle	 	1000	Ü	
			exyl)phthalate		840	J_	
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Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GE-55-V	
Project No.:	09928.00.0	21	Site	GRINRS LAG	Location:	FREMONT, OH	Group:	
Matrix: (soil	water)	SOIL	-			Lab Sample ID:	GB26-8	
Sample wt vo	ol:	10.0	ig mu	<u>G</u>		Lab File ID:	LUB028.D_	
Level (low	r med)	LOW				Date Received:	12/16/96	
% Moisture:	0		- de	ecanted: (Y N)	. N	Date Extracted:	12/16/96	
Concentrated	Extract Volu	me:	1000	(uL)		Date Analyzed:	12/17/96	
Injection Volu	me:	1.0	/uL)	_		Dilution Factor:	1.0	•
GPC Cleanup:	: (Y/N)	N	•	рН	. 7		<u></u> -	
			-		Concentrat	ion Units:		
CA	S No.	Compound		1	ug:L or ug/K	g) ug/Kg	Q	
108	B-95-2	Phenoi			Τ	1000	U	,
95-	-50-1	1,2-Dichlord	benzene	•	1	1000	U	
95-	-48-7	2-Methylph	enol		I	1000	U	
	6-44-5	4-Methylph	enol			1000	U	
78-	-59-1	Isophorone				1000	U	
120	0-82-1	1,2,4-Trich	orobenz	ene		1000	U	
	20-3	Naphthalene	<u> </u>	· · · · · · · · · · · · · · · · · · ·		1000	U	
	57-6	2-Methylna	ohthalen	e		1000	U	
 -	73-7	Fluorene	_			1000	U	
117	7-81-7	bis(2-Ethylh	exyl)phti	halate		570	J	
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Lab Name:	ERM-FAST			Contract:	LUBRIZOL	GL-SS-G	B-2 8-10'
Project No.	: 09928.00.0	1	Site: GRINRS LAG	Location:	FREMONT, OH	Group:	
Matrix: (so	oil/water)	SOIL			Lab Sample ID:	GB28-10	
Sample wt/	/vol:	10.0	(g/mL) <u>G</u>		Lab File ID:	LUB029.D	
Level: (lo	ow/med)	LOW			Date Received:	12/16/96	•
% Moisture	: 0		decanted: (Y/N):	<u>N</u>	Date Extracted:	12/16/96	
Concentrate	ed Extract Volun	ne:	1000 (uL)		Date Analyzed:	12/17/96	
Injection Vo	olume:	1.0	(uL)		Dilution Factor:	1.0	
GPC Cleanu	up: (Y/N)	N	pH:	7			
С	AS No.	Compound	((Concentrati ug/L or ug/Ko		Q	
1	08-95-2	Phenol			1000	U	
 		1,2-Dichloro	benzene		1000	U	
9	5-48-7	2-Methylphe	enol		1000	U	
1	06-44-5	4-Methylphe	enol		1000	U	
7		Isophorone			1000	U	
		1,2,4-Trichle			1000	U	
		Naphthalene			1000	U	
		2-Methylnap	hthalene		1000	U	
		Fluorene	- <u></u>		1000	U	
11	17-81-7	bis(2-Ethylhi	exyl)phthalate		540	J	
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SAMPLE NO.

GL-WS-GB-2

Lab Name: ERM	I-FAST		Contract:	LUBRIZOL	GL-W3-GB-2
Project No.: 099	28.00.01	Site: GRINRS LAG	Location:	FREMONT, OH	Group:
Matrix: (soil water	WATER	-		Lab Sample ID:	WSGB-2
Sample wt/vol:	100.0	(g mL) ML		Lab File ID:	LUB054.D
Level: (low med		_		Date Received:	12/17/96
% Moisture:	100	decanted: (Y.N):	N	Date Extracted:	12/18/96
Concentrated Extra	ict Volume:	(uL)		Date Analyzed:	12/18/96
Injection Volume:	1.0	(uL)		Dilution Factor:	1.0
GPC Cleanup: (Y/N) <u>N</u>	pH:	7		
			Concentrat	ion Units:	•

		Concentration Units:	
CAS No.	Compound	(ug/L or ug/Kg) ug/L	Q
108-95-2	Phenol	100	U
95-50-1	1,2-Dichlorobenzene	100	U
95-48-7	2-Methylphenol	100	U
106-44-5	4-Methylphenol	100	U
78-59-1	Isophorone	100	U
120-82-1	1,2,4-Trichlorobenzene	100	U
91-20-3	Naphthalene	100	U
91-57-6	2-Methylnaphthalene	100	U
86-73-7	Fluorene	100	U
117-81-7	bis(2-Ethylhexyl)phthalate	100	U
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Lab Name: ERM-FA	ST		Contract:	LUBRIZOL	GL-55-G	D-3 U-2
Project No.: 09928.0	00.01	Site: GRINRS LAG	Location:	FREMONT, OH	Group: _	
Matrix: (soil/water)	SOIL	<u>-</u>		Lab Sample ID:	GB30-2	
Sample wt/vol:	10.0	(g/mL) G		Lab File ID:	LUB030.D	•
Level: (low/med)	LOW	_		Date Received:	12/17/96	
% Moisture:0		decanted: (Y/N):	N	Date Extracted:	12/17/96	
Concentrated Extract V	olume:	1000 (uL)		Date Analyzed:	12/17/96	
Injection Volume:	1.0	(uL)		Dilution Factor:	1.0	
GPC Cleanup: (Y/N)	N	pH:	7			
•			Concentrat	ion Units:		
CAS No.	Compound	((ug/L or ug/K	g) ug/Kg	Q	
108-95-2	Phenol			1000	U	
95-50-1	1,2-Dichlord	benzene		1000	U	
95-48-7	2-Methylphe			1000	U	
106-44-5	4-Methylphe	enol		1000	U	
78-59-1	Isophorone			1000	U	
120-82-1	1,2,4-Trichl			1000	U	
91-20-3	Naphthalene			1000	U	
91-57-6 86-73-7	2-Methylnar Fluorene	onthalene		1000	U	
117-81-7		exyl)phthalate		1000	1	
117-01-7	DISTECTIVITI	exyr/pritrialate		1000	 	
						
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SAMPLE NO.

GL-SS-GB-3 2-4'

Lab Name: ER	M-FAST			Contract:	LUBRIZOL	
Project No.: 09	928.00.01	Site	e: GRINRS LAG	Location:	FREMONT, OH	Group:
Matrix: Isoil wat	er) SO	liL			Lab Sample ID:	GB32-4
Sample wt vol:	10	.0 ·g mL	G		Lab File ID:	LUB031.D
Level llow me	ed) LO	V			Date Received:	12/17/96
್ಜ Moisture:	0	c	decanted (Y N)	N	Date Extracted:	12/17/96
Concentrated Ext	ract Volume:	1000)_(uL)		Date Analyzed:	12/17/96
Injection Volume:	1.	O(uL)			Dilution Factor:	1.0
GPC Cleanup: (Y	N) N	<u> </u>	pH:	7		
				C	an Unita	

		Concentration Units:					
CAS No.	Compound	(ug 'L or ug/Kg) ug/Kg	Q				
108-95-2	Phenol	1000	U				
95-50-1	1,2-Dichlorobenzene	1000	U				
95-48-7	2-Methylphenol	1000	U				
106-44-5	4-Methylphenol	1000	U				
78-59-1	Isophorone	1000	υ				
120-82-1	1,2,4-Trichlorobenzene	1000	U				
91-20-3	Naphthalene	1000	υ				
91-57-6	2-Methylnaphthalene	1000	U				
86-73-7	Fluorene	1000	U				
117-81-7	bis(2-Ethylhexyliphthalate	1000	U				
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				_		GL-SS-0	3B-3 4-6'
Lab Name:	ERM-FAST			Contract:	LUBRIZOL		
Project No.:	09928.00.0	1	Site: GRINRS LAG	Location:	FREMONT, OH	Group:	
Matrix: (soil/	/water)	SOIL			Lab Sample ID:	GB34-6	
Sample wt/v	ol:	10.0	(g/mL) G		Lab File ID:	LUB032.D	
Level: (low	v/med)	LOW			Date Received:	12/17/96	
% Moisture:	0		decanted: (Y/N):	N	Date Extracted:	12/17/96	•
Concentrated	d Extract Volum	ne:	1000 (uL)		Date Analyzed:	12/17/96	
Injection Volu	ume:	1.0	(uL)		Dilution Factor:	1.0	
GPC Cleanup	o: (Y/N)	N	pH:	7			
				Concentrat	tion Units:		
		Compound		ug/L or ug/K		Q	•
10	8-95-2	Phenol		i	500	J	
95-	-50-1	1,2-Dichloro	benzene		1000	U	
95	-48-7	2-Methylphe	nol		1000	U	
100	6-44-5	4-Methylphe	nol		1000	U	
78	-59-1	Isophorone			1000	U	1
120	0-82-1	1,2,4-Trichle	probenzene		1000	U	
		Naphthalene			1000	Ü	
		2-Methylnap		 	1000	Ü	
		Fluorene	TETOTO TO	 	1000	Ü	
			exyl)phthalate	 	1000	- ŭ	
 '- '-	7-01-7	DISTZ-EUTYINE	хуприниальн	 	1000		
 							
 				 		 	
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Lab Name	ERM-FAST				Contract	LUBRIZOL	GL-SS-GB-3 6-
Project No.:	09928.00.0	1	Site	GRINRS LA	G Location	FREMONT, OH	Group:
Matrix: (soil	water)	SOIL	_			Lab Sample ID:	GB36-8
Sample wt ve	ol:	10.0	g mL	G		Lab File ID:	LUB038.D
Level #low	v med)	LOW	_			Date Received:	12/17/96
% Moisture:	0		d	ecanted: 🗥 N	li: N	Date Extracted:	12/17/96
Concentrated	Extract Volum	ne:	1000	(uL·		– Date Analyzed:	12/17/96
Injection Volu	ume:	1.0	(uL)	_		Dilution Factor:	1.0
GPC Cleanup	o: (Y/N)	N		pl	H: 7	_	
			_		Concentr	ation Units:	
CA	S No.	Compound			(ug/L or ug/	Kg) <u>ug/Kg</u>	a _
10	8-95-2	Phenol				1E + 05	
95	-50-1	1,2-Dichloro	obenzene	?		1000	U
95	-48-7	2-Methylph	enol			1000	υ
10	6-44-5	4-Methylph	enoi			1000	U
78	-59-1	Isophorone				1000	U
12	0-82-1	1,2,4-Trichl	orobenz	ene		1000	U
91	-20-3	Naphthalene	•			1000	U
91	-57-6	2-Methylna	phthalen	e		1000	U .
86	-73-7	Fluorene				1000	U
11	7-81-7	bis(2-Ethylh	exyl)pht	halate		520	J
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	ERM-FAST				Contract:	LUBRIZOL		
Project No.:	09928.00.0	1	Site:	GRINRS LAG	Location:	FREMONT, OH	Group:	
Matrix: (soil/v	water)	SOIL				Lab Sample ID:	GB38-10	
Sample wt/vol	t:	10.0	(g/mL)	G		Lab File ID:	LUB039.D	
Level: (low/	/med)	LOW				Date Received:	12/17/96	
% Moisture:	0		de	canted: (Y/N):	N	Date Extracted:	12/17/96	
Concentrated	Extract Volum	ne:	1000	(uL)		Date Analyzed:	12/18/96	
Injection Volur	me:	1.0	(uL)			Dilution Factor:	1.0	
GPC Cleanup:	(Y/N)	N		pH:	7			
					Concentrati			
		Compound		((ug/L or ug/Kg		<u> </u>	ı
<u></u>		Phenol				2E+05		
		1,2-Dichloro	benzene		<u></u>	1000	U	•
95-4	48-7	2-Methylphe	nol			1000	U	
106	-44-5	4-Methylphe	nol			1000	U	
78-5	59-1	Isophorone		_		1000	U	
120	-82-1	1,2,4-Trichle	orobenze	ne		1000	U	
91-2		Naphthalene				1000	U	
91-5		2-Methylnap		;		1000	U	
86-7		Fluorene				1000	U	i
		bis(2-Ethylhe	exyl)phth	nalate		440	J	
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SAMPLE NO.

GL-SS-GB-3 10-12

Lab Name:	ERM-FAST			Contract:	LUBRIZOL	
Project No.:	09928.00.01		Site: GRINRS LAG	Location:	FREMONT, OH	Group:
Matrix: (soil	water)	SOIL	_		Lab Sample ID:	GB310-12
Sample wt vo	:k	10.0	ig mL) <u>G</u>		Lab File ID:	LUB040.D
Level: (low	med)	LOW			Date Received:	12/17/96_
% Moisture:	0		decanted: (Y N :	N	Date Extracted:	12/17/96_
Concentrated	Extract Volume	e :	1000 (uL)		Date Analyzed:	12/18/96_
Injection Volu	me: _	1.0	(uL)		Dilution Factor:	1.0
GPC Cleanup:	(Y/N)	N	pH:	7		
				Concentrat	ion Units:	
CAS	S No.	'omnouend	ts.	ia Lorua/Ka	a) ua/Ka	0

		Concentration onns.	
CAS No.	Compound	(ug.L or ug/Kg)	ug/Kg Q
108-95-2	Phenol	1600	
95-50-1	1,2-Dichlorobenzene	1000	U
95-48-7	2-Methylphenol	1000	U
106-44-5	4-Methylphenol	1000	U
78-59-1	Isophorone	1000	U
120-82-1	1,2,4-Trichlorobenzene	1000	υ
91-20-3	Naphthalene	1000	U
91-57-6	2-Methylnaphthalene	1000	U
86-73-7	Fluorene	1000	U
117-81-7	bis(2-Ethylhexyl)phthalate	630	J
	 		
			
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Lab Name: ERM-FAST			Contract:	LUBRIZOL	GL-WS-GB-3	
Project No.: 09928.00.0)1	Site: GRINRS LAG	Location:	FREMONT, OH	Group:	
Matrix: (soil/water)	WATER			Lab Sample ID:	WSGB-3	
Sample wt/vol:	250.0	(g/mL) ML		Lab File ID:	LUB037.D	
Level: (low/med)				Date Received:	12/17/96	
% Moisture: 100	_	decanted: (Y/N):	N	Date Extracted:	12/17/96	
Concentrated Extract Volume	me:	1000 (uL)		Date Analyzed:	12/17/96	
Injection Volume:	1.0	(uL)		Dilution Factor:	1.0	
GPC Cleanup: (Y/N)	N	pH:	7			
			Concentrat	ion Units:		
CAS No.	Compound	(1	ug/L or ug/K	g) ug/L	Q	
108-95-2	Phenol			100	· U	
95-50-1	1,2-Dichlord	benzene		100	U	
95-48-7	2-Methylphe	enol		100	U	
106-44-5	4-Methylphe	enol		100	U	
78-59-1	Isophorone			100	U	
120-82-1	1,2,4-Trichl	orobenzene		100	U	
91-20-3	Naphthalene			100	U	
91-57-6	2-Methylnar	hthalene		100	U	
86-73-7	Fluorene			100	U	
117-81-7	bis(2-Ethylh	exyl)phthalate		100	U	
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		SE	GL-SS-GB-4 0-2						
Lab Name:	ERM-FAST				_	Contract:	LUBRIZOL	GL-55-G	.B-4 U-2
Project No.:	09928.00.0	<u>)</u> 1	Site:	GRINRS L	AG	Location:	FREMONT, OH	Group:	
Matrix: (soil:	water)	SOIL					Lab Sample ID:	GB40-2	
Sample wt vo	ol:	100	g mL)	G	_		Lab File ID:	LUB042.D	
Level llow	r med)	LOW	_		_		Date Received:	12/17/96	
● Moisture:	0	_	de	canted: Y	NI:	N_	Date Extracted:	12/17/96	
Concentrated	Extract Volu	me:	1000	(uL)			Date Analyzed:	12/18/96	
injection Volu	ıme:	1.0	(uL)				Dilution Factor:	1.0	
GPC Cleanup:	: (Y/N)	N			pH:	7			
		<u> </u>				Concentrat	ion Units:		
CA	S No.	Compound			(1	ug⁴Lorung/Ko	g) <u>ug/Kg</u>	a	
108	8-95-2	Phenol		 -			1000	U	
95-	-50-1	1,2-Dichlord	benzene				1000	Ü	
95-	48-7	2-Methylphe	enol				1000	U	
100	6-44-5	4-Methylphe	enol				1000	υ	
78-	-59-1	Isophorone					1000	U	
	0-82-1	1,2,4-Trichl	orobenze	ne			1000	U	
91-	20-3	Naphthalene	:				1000	U	
	57-6	2-Methylnag	hthalene				1000	U	•
86-	73-7	Fluorene					1000	U	
117	7-81-7	bis(2-Ethylh	exyl)phth	nalate			580	J	
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		S DATA SHEET	GL-SS-GB-4 2-4'			
Lab Name	: ERM-FAST			Contract:	LUBRIZOL	
Project No	0.: 09928.00.0	<u>)</u> 1	Site: GRINRS LAG	Location:	FREMONT, OH	Group:
Matrix: (s	oil/water)	SOIL	_		Lab Sample ID:	GB42-4
Sample w	t/vol:	10.0	(g/mL) G		Lab File ID:	LUB043.D
Level: (low/med)	LOW	_		Date Received:	12/17/96
% Moistur	re: <u> </u>	-	decanted: (Y/N):	N	Date Extracted:	12/17/96
Concentra	ted Extract Volui	me:	1000 (uL)		Date Analyzed:	12/18/96
Injection V	/olume:	1.0	_(uL)		Dilution Factor:	1.0
GPC Clean	nup: (Y/N)	N	pH:	7		
				Concentrat	ion Units:	
(CAS No.	Compound	(1	ug/L or ug/K	g) ug/Kg	Q
	108-95-2	Phenol			1000	Ū
	95-50-1	1,2-Dichlord	benzene		1000	U
	95-48-7	2-Methylphe			1000	υ
 -	106-44-5	4-Methylphe	enol		1000	U
ļ	78-59-1	Isophorone		<u> </u>	1000	U
<u>.</u>	120-82-1	1,2,4-Trichl			1000	<u>U</u>
-	91-20-3	Naphthalene			1000	U
F	91-57-6	2-Methylnar	onthalene		1000	<u> </u>
ļ-	86-73-7	Fluorene	a.v.d\nbthalata		1000 540	J
}	117-81-7	bis(2-Ethyln	exyl)phthalate	·	540	-
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pH: 7

SAMPLE NO.

GL-SS-GB-4 4-6' Lab Name: ERM-FAST LUBRIZOL Contract: Project No.: 09928.00.01 Site: GRINRS LAG Location: FREMONT, OH Group: Matrix (soil water) SOIL Lab Sample ID: GB44-6 10.0 ig mL) G Sample wt vol: Lab File ID: LUB044.D Level: llow med) LOV. Date Received: 12/17/96 ® Moisture: 0 decanted. (\(\frac{1}{2}\) N): N Date Extracted: 12/17/96 Concentrated Extract Volume: 1000 (uL: Date Analyzed: 12/18/96 1.0 ___ iuL. Dilution Factor: 1.0 injection Volume:

GPC Cleanup: (Y N)

N

		Concentration Uni	its:	
CAS No.	Compound	(ug.L or ug/Kg)	_ug/Kg_	Q
108-95-2	Pheno!	10	00	U
95-50-1	1,2-Dichlorobenzene	10	00	Ū
95-48-7	2-Methylphenol	10	00	U
106-44-5	4-Methylphenol	10	00	U
78-59-1	Isophorone	10	00	U
120-82-1	1,2,4-Trichlorobenzene	10	00	U
91-20-3	Naphthalene	10	00	U
91-57-6	2-Methylnaphthalene	10	00	U
86-73-7	Fluorene	10	00	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	00	U
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Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GL-SS-GE	3-4 6-8'
Project No.:	09928.00.0	1	Site:	GRINRS LAG		FREMONT, OH	Group:	
Matrix: (soi	l/water)	SOIL	•			Lab Sample ID:	GB46-8	
Sample wt/v	vol:	10.0	_ (g/mL)	G		Lab File ID:		
Level: (lo	w/med)	LOW	- -			Date Received:	12/17/96	
% Moisture:	00		de	canted: (Y/N):	N	Date Extracted:	12/17/96	
Concentrate	d Extract Volun	ne:	1000	(uL)		Date Analyzed:	12/18/96	
Injection Vol	ume:	1.0	(uL)			Dilution Factor:	1.0	
GPC Cleanu	p: (Y/N)	N	_	pH:	7			
CA	AS No.	Compound		{ (Concentrat		a	
110	08-95-2	Phenol				1500		
		1,2-Dichloro	benzene			1000	U	•
95	5-48-7	2-Methylphe	enol			1000	U	
10	06-44-5	4-Methylphe	enol			1000	U	
78		Isophorone				1000	U	
12	20-82-1	1,2,4-Trichle	orobenzei	ne		1000	U	
		Naphthalene				1000	U	
_		2-Methylnar	hthalene			1000	U	
<u> </u>		Fluorene				1000	U	
11	7-81-7	bis(2-Ethylh	exyl)phth	alate		720	J	
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					GL-WS-GE
Lab Name: ERM-F	AST		Contract:	LUBRIZOL	
Project No.: 0992	8.00.01	Site: GRINRS LA	G Location:	FREMONT, OH	Group:
Matrix: (soil/water)	WATER	_		Lab Sample ID:	WSGB-4
Sample wt vol:	100.0	(g mL) ML		Lab File ID:	LUB055.D
evel: (low med)		_		Date Received:	12/17/96
Moisture: 10	00	decanted: (Y N	D: <u>N</u>	Date Extracted:	12/18/96
Concentrated Extract	t Volume:	1000_(uL)		Date Analyzed:	12/18/96
njection Volume:	1.0	(uL)		Dilution Factor:	1.0
SPC Cleanup: (Y/N)	N	_ _ pl	H: 7		
		_	Concentrat	tion Units:	
CAS No.	Compound		(ug/L or ug/K	g) <u>ug/L</u>	Q
108-95-2	Phenoi			100	U
95-50-1	1,2-Dichlore	benzene		100	U
95-48-7	2-Methylph	enol		100	U
106-44-5	4-Methylph	enol		100	U
78-59-1	Isophorone			100	U
120-82-1	1,2.4-Trichl	orobenzene		100	U
91-20-3	Naphthalen	•		100	U
91-57-6	2-Methylna	ohthalene	1	100	U
86-73-7	Fluorene		<u> </u>	100	U
117-81-7	bis(2-Ethylh	exyl)phthalate		100	U
			 		
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Lab Name:	ERM-FAST					Contract:	LUBRIZOL	GL-SS-C	3B-5 0-2'
Project No.:		1	Site	GRINRS L	- AG		FREMONT, OH	Group:	
Matrix: (soil/v	water)	SOIL					Lab Sample ID:	GB50-2	
Sample wt/vo	ol;	10.0	- (g/mL)	G			Lab File ID:	LUB046.D	
Level: (low	/med)	LOW	•		_		Date Received:	12/17/96	•
% Moisture:	0		- d∈	ecanted: (Y	/N):	N	Date Extracted:	12/18/96	
Concentrated	Extract Volun	ne:	1000		•		Date Analyzed:		
Injection Volu	me:	1.0	(uL)	-			Dilution Factor:		-
GPC Cleanup:	(Y/N)	N	•		:Hq	7			
·	•	····	•		•	Concentration	on Units:		
CAS	S No.	Compound			(L	ıg/Ĺ or ug/Kg	ug/Kg	O	
108	3-95-2	Phenol					1000	Ū	
95-	50-1	1,2-Dichlord	benzene				1000	U	
95-4	48-7	2-Methylphe	enol				1000	U	
106	-44-5	4-Methylphe	enol				1000	U	
78-	59-1	Isophorone					1000	Ü	
120)-82-1	1,2,4-Trichl	orobenze	ene			1000	U	
91-2	20-3	Naphthalene					1000	Ü	
91-	57-6	2-Methylnar	hthalen	9			1000	U	
86-	73-7	Fluorene					1000	U	
117	'-81-7	bis(2-Ethylh	exyl)phti	nalate			1000	U	
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SAMPLE NO.

GL-SS-GB-5 2-4'

Lab Name	ERM-FAST			Contract:	LUBRIZOL	
Project No	.: <u>09928.00.</u> 0	21	Site: GRINRS LAG	Location:	FREMONT, OH	Group:
Matnx: (s	oil water)	SOIL	_		Lab Sample ID:	GB52-4
Sample wi	vol:	10.0	g mL) G		Lab File ID:	LUB047.D
Level: //	ow med)	LOW	_		Date Received:	12/17/96
°₀ Moistur	e: 0	-	decanted: (Y N):	<u> </u>	Date Extracted:	12/18/96
Concentrat	ted Extract Volu	me:	1000 (uL)		Date Analyzed:	12/18/96
Injection V	olume:	1.0	_(uL)		Dilution Factor:	1.0
GPC Clean	up: (Y/N)	N	pH:	7		_
				Concentrati	ion Units:	•
(CAS No.	Compound	((ug/Lorug/Ko	g) <u>ug/Kg</u>	Q
ſ	108-95-2	Phenol			1000	U
	95-50-1	1.2-Dichlore	obenzene		1000	U

CAS No.	Compound	(ug/L or ug/Kg)	ug/Kg	Q
108-95-2	Phenol	1000		U
95-50-1	1,2-Dichlorobenzene	1000		U
95-48-7	2-Methylphenol	1000		U
106-44-5	4-Methylphenol	1000		U
78-59-1	Isophorone	1000		U
120-82-1	1,2,4-Trichlorobenzene	1000	•	U
91-20-3	Naphthalene	1000		U
91-57-6	2-Methylnaphthalene	1000		U
86-73-7	Fluorene	1000		U
117-81-7	bis(2-Ethylhexyl)phthalate	1000		υ
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							GL-SS-GB-5 4	-6'
Lab Name:	ERM-FAST				Contract:	LUBRIZOL	L	
Project No.:	09928.00.0	1	Site	: GRINRS LAG	Location:	FREMONT, OH	Group:	
Matrix: (soil/v	water)	SOIL	_			Lab Sample ID	GB54-6	
Sample wt/vo	d:	10.0	_{g/mL)	G		Lab File ID	LUB048.D	
Level: (low,	/med)	LOW	_			Date Received	12/17/96	
% Moisture:	0		ď	ecanted: (Y/N):	N	Date Extracted	12/18/96	
Concentrated	Extract Volur	ne:	1000	_ (uL)		Date Analyzed	12/18/96	
Injection Volum	me:	1.0	_(uL)			Dilution Factor	1.0	
GPC Cleanup:	(Y/N)	N	_	:Hq	7			
					Concentrat	ion Units:		
CAS	S No.	Compound		((ug/L or ug/K	g) <u>ug/Kg</u>	Q	
108	3-95-2	Phenol				1000	U	
95-	50-1	1,2-Dichlord	benzen	e		1000	U	
95-4	48-7	2-Methylphe	enol			1000	U	
106	6-44-5	4-Methylphe	enol			1000	U	
78-5	59-1	Isophorone				1000	U	
120	-82-1	1,2,4-Trichl	orobenz	ene		1000	U	
91-2	20-3	Naphthalene	•			1000	U	
91-5	57-6	2-Methylnar	hthalen	e		1000	U	
	73-7	Fluorene				1000	U	
	'-81-7	bis(2-Ethylh	exyl)pht	halate		1000	U	
		 						
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Lab Name	ERM-FAST				Contract:	LUBRIZOL	GL-SS-GB-5 (
Project No	.: 09928.00.	<u>0</u> 1	Site:	GRINRS LAC	Location:	FREMONT, OH	Group:
Matrix: Is	oil water)	SOIL	-			Lab Sample ID:	GB56-8
Sample wi	vol:	10.0	ig mLi	<u>G</u>		Lab File ID:	LUB049.D
Level: (I	ow med)	LOW	-			Date Received:	12/17/96
© Moistur	e: <u> </u>	_	de	canted: (Y N	N	Date Extracted:	12/18/96
Concentrat	ted Extract Volu	ime:	1000	(uL)		Date Analyzed:	12/18/96
Injection V	olume:	1.0	(uL)			Dilution Factor:	1.0
GPC Clean	up: (Y'N)	N	-	рН	:		
(CAS No.	Compound			Concentrations/L or ug/K		Q
F	108-95-2	Phenol			1	1000	U
	95-50-1	1,2-Dichlord	benzene		† -	1000	U
<u> </u>	95-48-7	2-Methylphi	enol		<u> </u>	1000	U
[106-44-5	4-Methylphe	enol			1000	U
	78-59-1	Isophorone			Ĭ	1000	U
[120-82-1	1,2,4-Trichl	orobenze	ene		1000	U
[9	91-20-3	Naphthalene				1000	U ,
-	91-57-6	2-Methylna	ohthalen	P		1000	υ
<u> </u>	36-73-7	Fluorene				1000	U
F	117-81-7	bis(2-Ethylh	exyl)phti	halate		1000	U
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							GL-SS-G	B-5 8-10'
Lab Name:	ERM-FAST				Contract:	LUBRIZOL	L	
Project No.:	09928.00.0	1	Site: Gl	RINRS LAG	Location:	FREMONT, OH	Group:	
Matrix: (soil/	water)	SOIL	_			Lab Sample ID:	GB58-10	
Sample wt/vo	ol:	10.0	(g/mL) G			Lab File ID:	LUB050.D	
Level: (low	/med)	Low	_	-		Date Received:	12/17/96	•
% Moisture:	0		deca	nted: (Y/N):	N	Date Extracted:	12/18/96	
	Extract Volum			_		Date Analyzed:	12/18/96	
njection Volu	ıme:	1.0	(uL)			Dilution Factor:	1.0	
GPC Cleanup:	: (Y/N)	N	_	pH:	7			
			_	•	Concentrat	ion Units:		
CA	S No.	Compound		(u	ig/L or ug/Ko	g) <u>ug/Kg</u>	Q	
108	3-95-2	Phenol				1000	U	
	50-1	1,2-Dichlord	****			1000	U	
	48-7	2-Methylphe				1000	U	
) -	6-44-5	4-Methylphe	enol			1000	U	
	59-1	isophorone				1000	U	
	0-82-1	1,2,4-Trichl			· · · · · · · · · · · · · · · · · · ·	1000	U	
	20-3	Naphthalene				1000	U	
	57-6	2-Methylnar	onthalene			1000	U	
 -	73-7	Fluorene	* * * * * * * * * * * * * * * * * * * *			1000	U	
1114	7-81-7	bis(2-Ethylh	exyi)phthala	ate		1000	U	
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SAMPLE NO.

GL-WS-GB-5

Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GL-W.	J-GD-5
Project No.:	09928.00.0	1	Site	GRINRS LAG	Location:	FREMONT, OH	Group:	
Matrix, isoili	water)	WATER	_			Lab Sample ID:	WSGB-5	
Sample wt vo	oł:	100.0	rg mL)	ML		Lab File ID:	LUB056.D	
level dow	r med)		_			Date Received:	12/17/96	
^a ∈Moisture:	100		de	canted: 🕶 Ni:	N	Date Extracted:	12/18/96	
Concentrated	Extract Volum	ne:	1000	(uL)		Date Analyzed:	12/18/96	
Injection Volu	ıme:	1.0	(uL)			Dilution Factor:	1.0	•
GPC Cleanup	: (Y/ N)	N		pH:	7			
					Concentrat		_	
		Compound		(1	ug/Lorug/K		<u> </u>	
	8-95-2	Phenoi				100	U	
	-50-1	1,2-Dichloro				100	U	
	48-7	2-Methylphe				100	U	
.	6-44-5	4-Methylphe	nol			100	U	
	59-1	Isophorone				100	U	
	0-82-1	1,2,4-Trichle	probenze	ne		100	υ	
91.	20-3	Naphthalene				100	U	
91-	57-6	2-Methylnap	hthalene			100	U	
86-		Fluorene				100	υ	
117	7-81-7	bis(2-Ethylhe	exyliphth	nalate	<u>-</u> .	100	U	
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						GL-SS-G	3B-6 0-2'
Lab Name: ERM-FAST				Contract:	LUBRIZOL		`
Project No.: 09928.00.0	1	Site	GRINRS LAG	Location:	FREMONT, OH	Group:	
Matrix: (soil/water)	SOIL				Lab Sample ID:	GB60-2	
Sample wt/vol;	10.0	(g/mL)	G		Lab File ID:	LUB057.D	
Level: (low/med)	LOW				Date Received:	12/17/96	
% Moisture: 0		de	ecanted: (Y/N)	: N	Date Extracted:	12/18/96	
Concentrated Extract Volur	ne:	1000			Date Analyzed:		
Injection Volume:	1.0	(uL)	-		Dilution Factor:		
GPC Cleanup: (Y/N)	N	•	pH	: 7			
		•		Concentrat	ion Units:		
CAS No.	Compound			(ug/L or ug/K		a	
108-95-2	Phenol			T	1000	U	
95-50-1	1,2-Dichloro	benzene			1000	U	
95-48-7	2-Methylphe	enol	- 		1000	U	
106-44-5	4-Methylphe	enol			1000	U	
78-59-1	Isophorone				1000	U	
120-82-1	1,2,4-Trichle	orobenze	ene		1000	U	
91-20-3	Naphthalene)		Ţ	1000	U	
91-57-6	2-Methylnar	hthalen			1000	U	
86-73-7	Fluorene				1000	U	•
117-81-7	bis(2-Ethylh	exyl)phtl	nalate		1000	U	
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.ab Name:	ERM-FAST				C	111001701	GL-SS-GB-6 2-
	09928.00.0			<u></u>	Contract:	LUBRIZOL	
roject No.:	09928.00.0		Site:	GRINRS LAG	Location:	FREMONT, OH	Group:
Matrix: (soil	water)	SOIL	_			Lab Sample ID:	GB62-4
Sample wt vi	oł:	10.0	_1g mL)	G		Lab File ID:	LUB058.D
.evel: (low	r/med)	LOW	-			Date Received:	12/17/96
Moisture:	0		de	canted: (Y N):	N	Date Extracted:	12/18/96
Concentrated	Extract Volum	ne:	1000	(uL)		Date Analyzed:	12/18/96
njection Volu	me:	1.0	(uL)			Dilution Factor:	1.0
GPC Cleanup	i (Y/N)	N	_	pH:	7		
					Concentrat	tion Units:	
CA	S No.	Compound		(ug/L or ug/K	g) <u>ug/Kg</u>	<u>a</u>
10	8-95-2	Phenol				1000	U
95	-50-1	1,2-Dichlore	obenzene			1000	U
95	-48-7	2-Methylph	enol		T	1000	Ü
10	6-44-5	4-Methylph	enol			1000	U
78	-59-1	Isophorone				1000	U
120	0-82-1	1,2,4-Trich	orobenze	ene		1000	U
91	-20-3	Naphthalen	e			1000	U
91	-57-6	2-Methylna	phthalene	•		1000	U
86	-73-7	Fluorene				1000	U
11	7-81-7	bis(2-Ethylh	exyl)phti	nalate		1000	U
							
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Project No.: 09928.00.01 Site: GRINRS LAG Location: FREMONT, OH Group:	Lab Name: ERM-FAST			Contract:	LUBRIZOL	GL-SS-GB-6	4-6'
Matrix: (soil/water) SOIL Lab Sample ID: GB64-6 Sample wt/vol: 10.0 (g/mL) G Lab File ID: LUB059.D Level: (low/med) LOW Date Received: 12/17/96 % Moisture: 0 decanted: (Y/N): N Date Extracted: 12/18/96 Concentrated Extract Volume: 1.00 (uL) Date Analyzed: 12/18/96 Injection Volume: 1.0 (uL) Dilution Factor: 1.0 GPC Cleanup: (Y/N) N pH:	Project No.: 09928.00.	01	Site: GRINRS LAG	Location:	FREMONT, OH	Group:	
Level: (low/med) LOW Date Received: 12/17/96	Matrix: (soil/water)	SOIL					
% Moisture: 0 decanted: (Y/N): N Date Extracted: 12/18/96 Concentrated Extract Volume: 1000 (uL) Date Analyzed: 12/18/96 Injection Volume: 1.0 (uL) Dilution Factor: 1.0 CPC Cleanup: (Y/N) N pH: 7 7 Concentration Units: CAS No. Compound (ug/L or ug/Kg) ug/Kg Q 108-95-2 Phenol 1000 U 95-50-1 1,2-Dichlorobenzene 1000 U 95-48-7 2-Methylphenol 1000 U 106-44-5 4-Methylphenol 1000 U 78-59-1 Isophorone 1000 U 120-82-1 1,2,4-Trichlorobenzene 1000 U 91-20-3 Naphthalene 1000 U 91-57-6 2-Methylnaphthalene 1000 U 86-73-7 Fluorene 1000 U	Sample wt/vol:	10.0	- (g/mL) G		Lab File ID:	LUB059.D	
Concentrated Extract Volume: 1 000 (uL) Date Analyzed: 12/18/96 Injection Volume: 1.0 (uL) Dilution Factor: 1.0 GPC Cleanup: (Y/N) N pH: 7 Concentration Units: CAS No. Compound (ug/L or ug/Kg) ug/Kg Q 108-95-2 Phenol 1000 U 95-50-1 1,2-Dichlorobenzene 1000 U 95-48-7 2-Methylphenol 1000 U 106-44-5 4-Methylphenol 1000 U 78-59-1 Isophorone 1000 U 120-82-1 1,2,4-Trichlorobenzene 1000 U 91-20-3 Naphthalene 1000 U 91-57-6 2-Methylnaphthalene 1000 U 86-73-7 Fluorene 1000 U	Level: (low/med)	LOW			Date Received:	12/17/96	
Injection Volume: 1,0 (uL) Dilution Factor: 1.0	% Moisture: 0	_	decanted: (Y/N):	N	Date Extracted:	12/18/96	
CAS No. Compound Cug/L or ug/Kg Ug/Kg Q	Concentrated Extract Volu	ıme:	1000 (uL)		Date Analyzed:	12/18/96	
CAS No. Compound (ug/L or ug/Kg) ug/Kg Q 108-95-2 Phenol 1000 U 95-50-1 1,2-Dichlorobenzene 1000 U 95-48-7 2-Methylphenol 1000 U 106-44-5 4-Methylphenol 1000 U 78-59-1 Isophorone 1000 U 120-82-1 1,2,4-Trichlorobenzene 1000 U 91-20-3 Naphthalene 1000 U 91-57-6 2-Methylnaphthalene 1000 U 86-73-7 Fluorene 1000 U	Injection Volume:	1.0	(uL)		Dilution Factor:	1.0	
CAS No. Compound (ug/L or ug/Kg) ug/Kg Q 108-95-2 Phenol 1000 U 95-50-1 1,2-Dichlorobenzene 1000 U 95-48-7 2-Methylphenol 1000 U 106-44-5 4-Methylphenol 1000 U 78-59-1 Isophorone 1000 U 120-82-1 1,2,4-Trichlorobenzene 1000 U 91-20-3 Naphthalene 1000 U 91-57-6 2-Methylnaphthalene 1000 U 86-73-7 Fluorene 1000 U	GPC Cleanup: (Y/N)	N	pH:	7			
108-95-2 Phenol 1000 U 95-50-1 1,2-Dichlorobenzene 1000 U 95-48-7 2-Methylphenol 1000 U 106-44-5 4-Methylphenol 1000 U 78-59-1 Isophorone 1000 U 120-82-1 1,2,4-Trichlorobenzene 1000 U 91-20-3 Naphthalene 1000 U 91-57-6 2-Methylnaphthalene 1000 U 86-73-7 Fluorene 1000 U				Concentrati	on Units:		
95-50-1 1,2-Dichlorobenzene 1000 U 95-48-7 2-Methylphenol 1000 U 106-44-5 4-Methylphenol 1000 U 78-59-1 Isophorone 1000 U 120-82-1 1,2,4-Trichlorobenzene 1000 U 91-20-3 Naphthalene 1000 U 91-57-6 2-Methylnaphthalene 1000 U 86-73-7 Fluorene 1000 U	CAS No.	Compound	((ıg/L or ug/Kg	ug/Kg	α	
95-48-7 2-Methylphenol 1000 U 106-44-5 4-Methylphenol 1000 U 78-59-1 Isophorone 1000 U 120-82-1 1,2,4-Trichlorobenzene 1000 U 91-20-3 Naphthalene 1000 U 91-57-6 2-Methylnaphthalene 1000 U 86-73-7 Fluorene 1000 U	108-95-2	Phenol			1000	U	
106-44-5 4-Methylphenol 1000 U 78-59-1 Isophorone 1000 U 120-82-1 1,2,4-Trichlorobenzene 1000 U 91-20-3 Naphthalene 1000 U 91-57-6 2-Methylnaphthalene 1000 U 86-73-7 Fluorene 1000 U	95-50-1	1,2-Dichlor	benzene		1000	U	
78-59-1 Isophorone 1000 U 120-82-1 1,2,4-Trichlorobenzene 1000 U 91-20-3 Naphthalene 1000 U 91-57-6 2-Methylnaphthalene 1000 U 86-73-7 Fluorene 1000 U	95-48-7	2-Methylph	enol		1000	U	
120-82-1 1,2,4-Trichlorobenzene 1000 U 91-20-3 Naphthalene 1000 U 91-57-6 2-Methylnaphthalene 1000 U 86-73-7 Fluorene 1000 U	106-44-5	4-Methylph	enoi		1000	U ,	
91-20-3 Naphthalene 1000 U 91-57-6 2-Methylnaphthalene 1000 U 86-73-7 Fluorene 1000 U	78-59-1	Isophorone			1000	U	
91-57-6 2-Methylnaphthalene 1000 U 86-73-7 Fluorene 1000 U	120-82-1	1,2,4-Trichl	orobenzene		1000	U	
86-73-7 Fluorene 1000 U	91-20-3	Naphthalene	•		1000	U	
86-73-7 Fluorene 1000 U	91-57-6	2-Methylna	phthalene		1000	U	
117-81-7 bis(2-Ethylhexyl)phthalate 1000 U	86-73-7		·····		1000	U	
	117-81-7	bis(2-Ethylh	exyl)phthalate		1000	U	
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Lab Name:	ERM-FAST				Co	ontract:	LUBRIZOL	GL-SS-GB-6 6
Project No.:	09928.00.0	1	Site:	GRINRS LA	- AG Lo	cation:	FREMONT, OH	Group:
Matrix: (soil:	water)	SOIL	•				Lab Sample ID:	GB66-8
Sample wt.vo	N:	10.0	(g mL)	<u>G</u>	_		Lab File ID:	LUB060.D
Level: flow	med)	LOW					Date Received:	12/17/96
% Moisture:	0		de	canted: (Y	N)	N	Date Extracted:	12/18/96
Concentrated	Extract Volum	ne:	1000	(uL·			Date Analyzed:	12/18/96
Injection Volu	me:	1.0	(uL)				Dilution Factor:	1.0
GPC Cleanup:	(Y/N)	N	•	ı	pH:	7		
CAS	5 N o.	Compound				ncentrati . or ug/Kg	on Units:	Q
					TOG L	. or ug/kg		
	3-95-2	Phenol			——		1000	U
<u> </u>	50-1	1,2-Dichlore					1000	U
	48-7	2-Methylpho					1000	U
106	-44-5	4-Methylphe	enol				1000	U
78-	59-1	Isophorone					1000	U
120)-82-1	1.2,4-Trichle	orobenze	ene			1000	U
91-	20-3	Naphthalene	·				1000	U
91-	57-6	2-Methylnag	hthalene				1000	U
		Fluorene			$\neg \vdash$		1000	U
117	-81-7	bis(2-Ethylh	exyl)phtl	nalate			1000	U ,
	 							
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Lab Name	e: ERM-FAST			Contract:	LUBRIZOL	GL-SS-GB	S-6 8-10'
Project N	o.: 09928.00.0	21	Site: GRINRS LAG	Location:	FREMONT, OH	Group:	
Matrix: ((soil/water)	SOIL	_		Lab Sample ID:	GB68-10	
Sample v	vt/vol:	10.0	(g/mL) G		Lab File ID:	LUB071.D	
Level:	(low/med)	LOW	<u>-</u>		Date Received:	12/17/96	
% Moistu	ıre: 0	_	decanted: (Y/N):	N	Date Extracted:	12/18/96	
Concentra	ated Extract Volu	me:			Date Analyzed:	12/19/96	
Injection '	Volume:	1.0	_(uL)		Dilution Factor:	1.0	
GPC Clea	inup: (Y/N)	N	pH:	7			
	CAS No.	Compound	(1	Concentrat ug/L or ug/K		Q	
	108-95-2	Phenol	······································		770	J	
	95-50-1	1,2-Dichlore	henzene	 	1000	-	
	95-48-7	2-Methylph		 	1000	- 	
	106-44-5	4-Methylph			1000	Ü	•
	78-59-1	Isophorone			1000	U	
	120-82-1	1,2,4-Trichl	orobenzene		1000	Ü	
	91-20-3	Naphthalene)		1000	U	
	91-57-6	2-Methylna	ohthalene		1000	U	
	86-73-7	Fluorene			1000	U	
	117-81-7	bis(2-Ethylh	exyl)phthalate		810	JB	
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SAMPLE NO.

GL-WS-GB-6

Lab Name:	ERM-FAST				Contract:	LUBRIZOL	
Project No.:	09928.00.0	1	Site	GRINRS LAG	Location:	FREMONT, OH	Group:
Matrix: isoil	water)	WATER				Lab Sample ID:	WSGB6
Sample wt vo	oł:	100.0	ig mLi	ML		Lab File ID:	LUB064.D
Level: (low	v-med)					Date Received:	12/17/96
% Moisture:	100		de	canted: (Y N)	: <u>N</u>	Date Extracted:	12/18/96
Concentrated	i Extract Volun	ne:	1000	(uL)		Date Analyzed:	12/19/96
Injection Volu	ıme:	1.0	(uL)			Dilution Factor:	1.0
GPC Cleanup	i: (Y/N)	N		рН	:7		
					Concentrat	ion Units:	
CA	S No.	Compound		_	(ug/L or ug/K	g) <u>ug/L</u>	<u> </u>
10	8-95-2	Pheno!				100	U
95	-50-1	1,2-Dichloro	benzene		I	100	U
95-	-48-7	2-Methylphe	enol		<u> </u>	100	U
	6-44-5	4-Methylphe	noi			100	υ
	-59-1	Isophorone				100	U
	0-82-1	1,2,4-Trichle		ne		100	U
	-20-3	Naphthalene				100	U
	-57-6	2-Methylnac	hthalene	<u>:</u>		100	U
	-73-7	Fluorene				100	U
11	7-81-7	bis12-Ethylh	exyl)phti	nalate		100	U
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Lab Name: ERM-FAST			Contract:	LUBRIZOL	GL-SS-GB-7 0-2'	
Project No.: 09928.00.		Site: GRINRS LAG		FREMONT, OH	Group:	_
Matrix: (soil/water)	- SOIL			Lab Sample ID:		
Sample wt/vol:	10.0	(g/mL) G		Lab File ID:		
Level: (low/med)	LOW			Date Received:		
% Moisture: 0		decanted: (Y/N):	N	Date Extracted:		
Concentrated Extract Volu	me:	1000 (uL)		Date Analyzed:		
Injection Volume:	1.0			Dilution Factor:		
GPC Cleanup: (Y/N)	N	• ' '	7			
• • •		• .	Concentrat	ion Units:		
CAS No.	Compound	(ι	ıg/L or ug/Kç	g) <u>ug/Kg</u>	Q	
108-95-2	Phenol			1000	U	
95-50-1	1,2-Dichlord	benzene		1000	U	
95-48-7	2-Methylphe	enol		1000	Ü	
106-44-5	4-Methylphe	enol		1000	U	
78-59-1	Isophorone			1000	<u> </u>	
120-82-1	1,2,4-Trichl	orobenzene		1000	U	
91-20-3	Naphthalene			1000	U	
91-57-6	2-Methylnar	ohthalene		1000	U	
86-73-7	Fluorene			1000	U	
117-81-7	bis(2-Ethylh	exyl)phthalate		640	JB	
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SAMPLE NO.

GL-SS-GB-7 2-4'

Lab Name:	ERM-FAST			Contract:	LUBRIZOL	
Project No.:	09928.00.01		Site: GRINRS LAG	Location:	FREMONT, OH	Group:
Matrix: (soil v	water) _	SOIL	_		Lab Sample ID:	GB72-4
Sample wt vol	l: _	10.0	_ ig mLi _G		Lab File ID:	LUB067.D
Level: low	med) _	LOW	_		Date Received:	12/18/96
% Moisture:	0		decanted: (Y. Ni:	N	Date Extracted	_12/18/96_
Concentrated	Extract Volum	e:	1000 (uL)		Date Analyzed	12/19/96
Injection Volum	me:	1.0	_ (uL)		Dilution Factor	1.0
GPC Cleanup:	(Y/N)	N	pH:	7		
				_		

		Concentration Units	s :	
CAS No.	Compound	(ug/L or ug/Kg)	ug/Kg	Q
108-95-2	Phenoi	1000	0	U
95-50-1	1,2-Dichlorobenzene	1006	0	Ū
95-48-7	2-Methylphenol	1000	0	U
106-44-5	4-Methylphenol	1000	0	υ
78-59-1	Isophorone	100	0	υ
120-82-1	1,2,4-Trichlorobenzene	100	0	Ū
91-20-3	Naphthalene	100	0	U
91-57-6	2-Methylnaphthalene	100	0	U
86-73-7	Fluorene	100	0	U
117-81-7	bis(2-Ethylhexyl)phthalate	1000	0	U
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			O ANALION	0 071111 011227	GL-SS-GB-7 4-6'	
Lab Name: ERM	1-FAST		Contract:	LUBRIZOL		
Project No.: 099	28.00.01	Site: GRINRS LAG	Location:	FREMONT, OH	Group:	
Matrix: (soil/water	r) SOIL			Lab Sample ID:	GB74-6	
Sample wt/vol:	10.0	(g/mL) G		Lab File ID:	LUB068.D	
Level: (low/med) LOW			Date Received:	12/18/96	
% Moisture:	0	decanted: (Y/N):	N	Date Extracted:	12/18/96	
Concentrated Extra	act Volume:			Date Analyzed:	12/19/96	
Injection Volume:	1.0	(uL)		Dilution Factor:	1.0	
GPC Cleanup: (Y/N) <u>N</u>	pH:	7			
			Concentrat	ion Units:		
CAS No.	Compound	(L	ug/L or ug/Kg		Q	
108-95-				1000	U	
95-50-1	1,2-Dichloro	benzene	-	1000	U	
95-48-7				1000	U	
106-44-				1000	, U	
78-59-1	Isophorone			1000	U	
120-82-	1 1,2,4-Trichle	orobenzene		1000	U	
91-20-3	Naphthalene			1000	U ,	
91-57-6	2-Methylnar	hthalene		1000	U	
86-73-7	Fluorene			1000	U	
117-81-	7 bis(2-Ethylho	exyl)phthalate		440	JB	
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(ug/L or ug/Kg)

ug/Kg

SAMPLE NO.

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GL-SS-GB-7 6-8'

Lab Name:	ERM-FAST			Contract:	LUBRIZOL	<u></u>
Project No.:	09928.00.0	1	Site: GRINRS LAG	Location:	FREMONT, OH	Group:
Matnx: (soil	water)	SOIL	_		Lab Sample ID	GB76-8
Sample wt vo	oł:	10.0	ig mL) <u>G</u>		Lab File ID	LUB069.D_
Level: (low	/ med)	LOW	-		Date Received	12/18/96
® Moisture:	0		decanted: (Y/N):	N	Date Extracted	: 12/18/96
Concentrated	Extract Volum	ie:	1000 (uL)		Date Analyzed	: 12/19/96
Injection Volu	me:	1.0	_(uL)		Dilution Factor	:1.0
GPC Cleanup:	: (Y/N)	N	pH:	7		•
				Concentrat	ion Units:	

CAS No.

Compound

108-95-2	Phenol	1000	U
95-50-1	1.2-Dichlorobenzene	1000	U
95-48-7	2-Methylphenol	1000	U
106-44-5	4-Methylphenol	1000	U
78-59-1	Isophorone	1000	U
120-82-1	1,2,4-Trichlorobenzene	1000	U
91-20-3	Naphthalene	1000	U
91-57-6	2-Methylnaphthalene	1000	U
86-73-7	Fluorene	1000	U
117-81-7	bis(2-Ethylhexyl)phthalate	1000	Ū
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Lab Name: ERM-FAST				Contract:	LUBRIZOL	GL-SS-GE	3-7 8-10'
Project No.: 09928.00.0	21	Site:	GRINRS LAG	Location:	FREMONT, OH	Group:	
Matrix: (soil/water)	SOIL				Lab Sample ID:	GB78-10	
Sample wt/vol:	10.0	- (g/mL)	G		Lab File ID:	LUB072.D	
Level: (low/med)	LOW	-			Date Received:		
% Moisture: 0		- de	ecanted: (Y/N):	N	Date Extracted:		
Concentrated Extract Volu	– me:	1000			Date Analyzed:		•
Injection Volume:	1.0	(uL)	-		Dilution Factor:	1.0	
GPC Cleanup: (Y/N)	N	-	pH:	7			
		_	•	Concentrat	ion Units:		
CAS No.	Compound		((ug/L or ug/K	g) ug/Kg	a	
108-95-2	Phenol				1000	U	
95-50-1	1,2-Dichlore				1000	U	
95-48-7	2-Methylph	enol			1000	U	
106-44-5	4-Methylph	enol			1000	U	
78-59-1	Isophorone				1000	U	
120-82-1	1,2,4-Trich		ene		1000	U	
91-20-3	Naphthalen				1000	υ	
91-57-6	2-Methylna	phthalene	9		1000	U	
86-73-7	Fluorene				1000	U	
117-81-7	bis(2-Ethylh	exyl)phtl	nalate		1000	U	
							
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Lab Name ERM-FAST Contract: LUBRIZOL	
Project No 09928.00.01 Site GRINRS LAG Location: FREMONT, OH	Group:
Matrix (soil water) SOIL Lab Sample ID: GE	B710-12
Sample wt vol: 10.0 g mLi G Lab File ID: LU	UB073.D
Level (low med) LOW Date Received: 1	12/18/96
% Moisture: 0 decanted: (Y N): N Date Extracted: 1	12/18/96_
Concentrated Extract Volume: 1000 (uL) Date Analyzed: 1	12/19/96
Injection Volume: 1.0 (uL) Dilution Factor:	1.0
GPC Cleanup: (Y-N)N pH:7	
Concentration Units:	
CAS No. Compound (ug'L or ug.Kg) ug/Kg	Q
108-95-2 Phenol 1000	U

CAS No.	Compound	(ug L or ug Kg) ug/Kg	a
108-95-2	Phenol	1000	Ü
95-50-1	1,2-Dichlorobenzene	1000	U
95-48-7	2-Methylphenol	1000	U
106-44-5	4-Methylphenol	1000	U
78-59-1	Isophorone	1000	υ
120-82-1	1,2,4-Trichlorobenzene	1000	U
91-20-3	Naphthalene	1000	U
91-57-6	2-Methylnaphthalene	1000	U
86-73-7	Fluorene	1000	U
117-81-7	bis(2-Ethylhexyl)phthalate	800	JB
			
			
			
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Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GL-W	S-GB-7
Project No.:	09928.00.01	1	Site: GRI	NRS LAG	Location:	FREMONT, OH	Group:	
Matrix: (soil	(water)	WATER				Lab Sample ID:	WSGB7	
Sample wt/v	ol: _	100.0	(g/mL) <u>ML</u>			Lab File ID:		
Level: (low	v/med)		_			Date Received:	12/17/96	
% Moisture:	100		decante	ed: (Y/N):	N	Date Extracted:	12/18/96	
Concentrated	Extract Volum	e:	1000 (uL)			Date Analyzed:	12/19/96	
Injection Volu	ıme:	1.0	(uL)			Dilution Factor:	1.0	
GPC Cleanup	: (Y/N)	N		pH:	7			
	-		-	,	Concentrat		•	
		Compound		((ig/L or ug/K		<u> </u>	•
		Phenol				100	U	ı
		1,2-Dichlord				100	U	
		2-Methylpho				100	U	
		4-Methylphi	enol			100	U	
		sophorone				100	U	
_		1,2,4-Trichl				100	U	1
		Naphthalene				100	U	
		2-Methylna	hthalene			100	U	ı
		Fluorene				100	U	•
11	7-81-7	ois(2-Ethylh	exyl)phthalate			100	U	
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SAMPLE NO.

0-2'

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	ERM-FAST				LUBRIZOL	
Project No	09928.00	<u>.0</u> 1	Site: GRINRS LAG	Location.	FREMONT, OH	Group:
Matnx: ks	oil water)	SOIL	_		Lab Sample ID:	GB80-2
Sample w	t vol:	10.0	ig mL) <u>G</u>		Lab File ID:	LUB075.D
Level -	low med)	LOW	-		Date Received:	12/18/96
Moistu	re. <u>0</u>	_	decanted: (Y N)	. <u>N</u>	Date Extracted:	12/18/96
Concentra	ted Extract Vol	ume:	1000 (uL1		Date Analyzed:	12/19/96
njection \	/olume:	1.0	(uL)		Dilution Factor:	1.0
GPC Clear	nup: (Y N)	N	pH	:7		
				Concentrat	tion Units:	
	CAS No.	Compound		(ug.'L or ug/K		<u> </u>
	108-95-2	Phenol			1000	U
	95-50-1	1,2-Dichloro		 	1000	U
	95-48-7	2-Methylph		-	1000	U
	106-44-5	4-Methylph	enol	 	1000	U
	78-59-1	Isopnorone		 	1000	U
	120-82-1 91-20-3	1,2,4-Trichl		 	1000	U
	91-57-6	2-Methylna		+ -	1000	U
•	86-73-7	Fluorene	Arthorete	+	1000	U U
	117-81-7		exyliphthalate		1000	Ū,
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Lab Name:	ERM-FAST			Contract:	LUBRIZOL	GL-SS-GB-8 2-4'	
Project No.:	09928.00.0	1	Site: GRINRS LAG		FREMONT, OH	Group:	
Matrix: (soil/	water)	SOIL			Lab Sample ID:	GB82-4	
Sample wt/vo	ol:	10.0	(g/mL) G		Lab File ID:	LUB076.D	
Level: (low	/med)	LOW	-		Date Received:	12/18/96	
% Moisture:	0		decanted: (Y/N):	N	Date Extracted:	12/18/96	
Concentrated	Extract Volum	ne:	1000 (uL)		Date Analyzed:	12/19/96	
Injection Volu	me:	1.0	(uL)		Dilution Factor:	1.0	
GPC Cleanup:	: (Y/N)	N N	pH:	7			
CAS	S No.	Compound	(1	Concentrat		Q.	
		Phenol	<u>.</u>	T	1000		
	50-1	1,2-Dichloro	benzene	 	1000	Ü	
		2-Methylphe			1000	U	
<u> </u>		4-Methylphe		ļ.————	1000	 	
		Isophorone			1000	Ü	
	0-82-1	1,2,4-Trichle	orobenzene		1000	U	
		Naphthalene		<u> </u>	1000	Ū	
		2-Methylnar			1000	U	
86-	73-7	Fluorene			1000	U	
117	7-81-7	bis(2-Ethylh	exyl)phthalate		1000	U	
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Lab Name						LUBRIZOL	
Project No	09928.00.0	!	Site:	GRINRS LAG	Location:	FREMONT, OH	Group:
Matrix isoil v	water) _	SOIL				Lab Sample ID:	GB84-6
Sample wt vo	d:	100	g mL)	G		Lab File ID:	LUB077.D
Level: ilow	med)	LOW				Date Received:	12/18/96
⁰₀ Moisture:	0		de	canted: (Y N):	N	Date Extracted:	12/18/96
Concentrated	Extract Volum	ne:	1000	_(uL		Date Analyzed:	12/19/96
Injection Volui	me:	10	uLi			Dilution Factor:	1.0
GPC Cleanup:	(Y N)	<u> N</u>		pH:	7		
	_	_			Concentrat		_
		Compound			ug L or ug K		<u>Q</u>
		Phenol			.	1000	U
95.	50-1	1.2-Dichlorob	enzene	!		1000	U
95-4	48-7	2-Methylpher	юі		I	1000	U
106	5-44-5	4-Methylpher	ю			1000	U
78-9	59-1	Isophorone				1000	U
120)-82-1	1,2,4-Trichlo	robenze	ene		1000	U
91.	20-3	Naphthalene				1000	U
		2-Methylnaph	thalene		<u> </u>	1000	U
	<u>.</u>	Fluorene			 	1000	U
		bis(2-Ethylhe	kyl)phtl	nalate		580	JB
\vdash				<u></u>	<u> </u>		
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Lab Name: El	RM-FAST			Contract:	LUBRIZOL	GL-SS-GB-8 6-8'	
Project No.: 0			Site: GRINRS LAG		FREMONT, OH	Group:	
Matrix: (soil/wa		SOIL			Lab Sample ID:		
Sample wt/vol:	_	10.0	(g/mL) G		Lab File ID:		
Level: (low/m	 ned)	LOW			Date Received:		
% Moisture:	0		decanted: (Y/N):	N	Date Extracted:		
Concentrated Ex	ctract Volume	e:	1000 (uL)		Date Analyzed:		
Injection Volume	e:	1.0	(uL)		Dilution Factor:	1.0	
GPC Cleanup: (Y	//N)	N	pH:	7		 _	
				Concentrati	ion Units:		
CASN	No. C	ompound	{ι	ug/L or ug/Kg	g) <u>ug/Kg</u>	Q	
108-9	5-2 P	henol			1000	U ,	
95-50	-1 1	,2-Dichloro	benzene		1000	U	
95-48	-7 2	-Methylphe	noi		1000	U	
106-4	4-5 4	-Methylphe	nol		1000	U	
78-59	-1 Is	ophorone			1000	U .	
120-8	2-1 1	,2,4-Trichlo	probenzene		1000	U	
91-20	-3 N	aphthalene			1000	U	
91-57	-6 2	-Methylnap	hthalene		1000	U	
86-73	-7 F	luorene			1000	U	
117-8	1-7 b	is(2-Ethylhe	exyl)phthalate		580	JB	
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SAMPLE NO.

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Lab Name. ERM-FAST			Contract:	LUBRIZOL	GL-SS-GB-8 8
Project No.: 09928.00	.01	Site: GRINRS LA	G Location:	FREMONT, OH	Group:
Matrix: (soil water)	SOIL			Lab Sample ID:	GB88-10
Sample wt vol:	10.0	g mLi G		Lab File ID:	LUB079.D
Level: (low med)	LOW		•	Date Received:	12/18/96
% Moisture: 0	_	decanted: (Y f	N)· N	Date Extracted:	12/18/96
Concentrated Extract Volume	ume:	_1000_(uL)		Date Analyzed:	12/19/96
Injection Volume:	1 0	(uL)		Dilution Factor:	1.0
GPC Cleanup: (Y/N)	N	p	oH: 7		
			Concentrat	ion Units:	
CAS No.	Compound		(ug/L or ug/K	g) <u>ug/Kg</u>	Q
108-95-2	Phenol			1000	U
95-50-1	1,2-Dichloro	benzene		1000	U
95-48-7	2-Methylphi	enol		1000	U
106-44-5	4-Methylphe	enol		1000	U
78-59-1	Isophorone			1000	U
120-82-1	1,2,4-Trich	orobenzene		1000	U
91-20-3	Naphthalene	•		1000	U
91-57-6	2-Methylnar	ohthalene		1000	U
86-73-7	Fluorene			1000	U
117-81-7	bis(2-Ethylh	exyl)phthalate		1000	U
					

		•					GL-SS-GE	3-8 10-12'
Lab Name:	ERM-FAST				Contract:	LUBRIZOL		
Project No.:	09928.00.0	1	Site:	GRINRS LAG	Location:	FREMONT, OH	Group:	
Matrix: (soil/	(water)	SOIL				Lab Sample ID:	GB810-12	
Sample wt/vo	ol:	10.0	(g/mL)	G		Lab File ID:	LUB080.D	
Level: (low	r/med)	LOW				Date Received:	12/18/96	
% Moisture:	0		de	ecanted: (Y/N):	N	Date Extracted:	12/18/96	
Concentrated	Extract Volun	ne:	1000	_(uL)		Date Analyzed:	12/19/96	
Injection Volu	ıme:	1.0	(uL)			Dilution Factor:	1.0	
GPC Cleanup:	: (Y/N)	N		рН:	7			
					Concentrat	ion Units:		
CAS	S No.	Compound		((ug/L or ug/K	g) <u>ug/Kg</u>	a	
108	8-95-2	Phenol				1000	U	
95-	-50-1	1,2-Dichloro	benzene			1000	U	
95-	-48-7	2-Methylphe	nol			1000	U	
106	6-44-5	4-Methylphe	nol			1000	U	
78-	-59-1	Isophorone				1000	U	
120	0-82-1	1,2,4-Trichle	orobenze	ene	-	1000	U	
91-	-20-3	Naphthalene				1000	U	
91-	-57-6	2-Methylnap	hthalene	9		1000	U	
86-	73-7	Fluorene				1000	U	
117	7-81-7	bis(2-Ethylho	exyl)phtl	nalate		70000	В	•
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SAMPLE NO.

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			36	MIVULA	TILE UNGANIC	JO MINAL TOIS	DATA SHEET	GL-SS-GB-8	R 10.1
Lab Nam	ne: <u>E</u>	RM-FAST				Contract:	LUBRIZOL		
Project f	No.: <u>C</u>	9928.00.0	1	Site	GRINRS LAG	Location:	FREMONT, OH	Group:	GL-SS
Matrix:	(soil/wa	ater)	SOIL				Lab Sample ID:	GB-8 6	
Sample	wt vol:		10.0	(g·mL)	G		Lab File ID:	LUB104.D	
Level:	(low m	ned)	LOW				Date Received:	12/18/96	
% Moist	ture:	0		de	ecanted: (Y/N):	N	Date Extracted:	12/20/96	
Concent	rated E	ktract Volum	ne:	1000	_(uL)		Date Analyzed:	12/26/96	
Injection	Volum	e:	1.0	(uL)			Dilution Factor:	1.0	
GPC Cle	anup: (Y/N)	N	-	pH:	7			•
						Concentrati	on Units:		
	CAS	No.	Compound		(ug/L or ug/Kg	ug/Kg	a	
	108-9	5-2	Phenol	-		1	1000	U	
	95-50)-1	1,2-Dichloro	benzene	•		1000	U	
	95-48	3-7	2-Methylphe	nol			1000	U	
	106-4	4-5	4-Methylphe	enol			1000	U	
	78-59)-1	Isophorone				1000	U	
	120-8	32-1	1,2,4-Trichle	orobenze	ene		1000	U	
	91-20)-3	Naphthalene	;			1000	υ	
	91-57	7-6	2-Methylnac	hthalen	e		1000	U	
	86-73	3-7	Fluorene				1000	U	
	117-8	31-7	bis(2-Ethyfh	exyl)phti	halate		1000	U	
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Lab Name: ERM-FAST			Contract:	LUBRIZOL	GL-WS-GB-8
Project No.: 09928.00.		Site: GRINRS LAG			Group:
Matrix: (soil/water)	 WATER			Lab Sample ID:	
Sample wt/vol:	100.0	- (g/mL) <u>M</u> L		Lab File ID:	LUB085.D
Level: (low/med)				Date Received:	12/18/96
% Moisture: 100		decanted: (Y/N):	N	Date Extracted:	12/19/96
Concentrated Extract Volume	ume:	1000 (uL)		Date Analyzed:	12/20/96
Injection Volume:	1.0	(uL)		Dilution Factor:	1.0
GPC Cleanup: (Y/N)	N	pH:	7		•
			Concentrati	on Units:	• .
CAS No.	Compound		ug/L or ug/Kg	ug/L	a
108-95-2	Phenol			100	Ü
95-50-1	1,2-Dichlore			100	Ü
95-48-7	2-Methylph	enol		100	Ū
106-44-5	4-Methylph	enol	L	100	U
78-59-1	Isophorone			100	U
120-82-1	1,2,4-Trichl	orobenzene	Ĺ	100	U
91-20-3	Naphthalen			100	U
91-57-6	2-Methylna	ohthalene		100	Ü
86-73-7	Fluorene			100	U
117-81-7	bis(2-Ethylh	exyl)phthalate		100	U
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SAMPLE NO.

GL-SS-GB-9 0-2'

Lab Name:	ERM-FAST			Contract:	LUBRIZOL	
Project No.:	09928.00.0)1	Site: GRINRS LA	G Location:	FREMONT, OH	Group: GL-SS
Matrix: (soil	water)	SOIL	_		Lab Sample ID:	GB-9 1
Sample wt vo	d:	10.0	(g·mL) G		Lab File ID:	LUB099.D
Level: flow	'med)	LOW	_		Date Received:	12/18/96
% Moisture:	0		decanted: (Y')	N): N	Date Extracted	12/20/96
Concentrated	Extract Volum	ne:	1000 (uL)		Date Analyzed	12/26/96
injection Volu	me:	1.0	_(uL)		Dilution Factor:	1.0
GPC Cleanup:	(Y'N)	N	_ p	H:7		
				Concentrat	ion Units:	
CAS	S No.	Compound		(ug/L or ug/Kg	g) <u>ug/Kg</u>	a

CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	Q
108-95-2	Phenol	1000	U
95-50-1	1,2-Dichlorobenzene	1000	U
95-48-7	2-Methylphenol	1000	U
106-44-5	4-Methylphenol	1000	U
78-59-1	Isophorone	1000	U
120-82-1	1,2,4-Trichlorobenzene	1000	U
91-20-3	Naphthalene	1000	U
91-57-6	2-Methylnaphthalene	1000	U
86-73-7	Fluorene	1000	U
117-81-7	bis(2-Ethylhexyl)phthalate	1000	U
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						GL-SS-0	3B-9 2-4'
Lab Name: ERM-FAST	<u> </u>			Contract:	LUBRIZOL		 -
Project No.: 09928.00	<u>.0</u> 1	Site: GRII	NRS LAG	Location:	FREMONT, OH	Group:	GL;SS
Matrix: (soil/water)	SOIL	_			Lab Sample ID:	GB-9 2	
Sample wt/vol:	10.0	(g/mL) G			Lab File ID:	LUB100.D	
Level: (low/med)	LOW	_			Date Received:	12/18/96	
% Moisture: 0	_	decant	ed: (Y/N):	N	Date Extracted:	12/20/96	
Concentrated Extract Vol	ume:	1000 (uL)			Date Analyzed:	12/26/96	
Injection Volume:	1.0	_(uL)			Dilution Factor:	1.0	
GPC Cleanup: (Y/N)	N	_	pH:	7			
	. –			Concentrati	ion Units:		
CAS No.	Compound		((ıg/L or ug/Kç	g) ug/Kg	Q	
108-95-2	Phenol				1000	U	
95-50-1	1,2-Dichlore	benzene			1000	U	
95-48-7	2-Methylph	enol			1000	υ	
106-44-5	4-Methylph	enol			1000	U	
78-59-1	Isophorone				1000	U	
120-82-1	1,2,4-Trichl	orobenzene			1000	U	
91-20-3	Naphthalen	9			1000	C	
91-57-6	2-Methylna	ohthalene			1000	U	
86-73-7	Fluorene				1000	U	
117-81-7	bis(2-Ethylh	exyl)phthalate			1000	U	•
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SAMPLE NO.

GL-SS-GB-9 4-6'

Lab Name:	ERM-FAST			Contract:	LUBRIZOL	
Project No.:	09928.00.01		Site: GRINRS LAG	Location:	FREMONT, OH	Group: GL-SS
Matrix: (soil	water) _	SOIL	_		Lab Sample ID:	GB-9 3
Sample wt.vo	d:	10.0	(g·mL) G		Lab File ID:	LUB101.D
Level (low	·med)	LOW	_		Date Received:	12/18/96
⁰₀ Moisture:	0		decanted: (Y/N):	N	Date Extracted	12/20/96
Concentrated	Extract Volume	e :			Date Analyzed	12/26/96
Injection Volu	me: _	1.0	_(uL)		Dilution Factor	1.0
GPC Cleanup:	(Y/N)	N	_ pH:	7		
				Concentrat	ion Units:	

		Concentration Units:								
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	a							
108-95-2	Phenol	1000	U							
95-50-1	1,2-Dichlorobenzene	1000	U							
95-48-7	2-Methylphenol	1000	U							
106-44-5	4-Methylphenol	1000	U							
78-59-1	Isophorone	1000	U							
120-82-1	1,2,4-Trichlorobenzene	1000	U							
91-20-3	Naphthalene	1000	U							
91-57-6	2-Methylnaphthalene	1000	U							
86-73-7	Fluorene	1000	Ü							
117-81-7	bis(2-Ethylhexyl)phthalate	1000	U							
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Lab Name:	ERM-FAST				Contract:	LUBRIZOL	<u> </u>
Project No.:	09928.00.0	1	Site:	GRINRS LAG	Location:	FREMONT, OH	Group: GL-SS
Matrix: (soil/	/water)	SOIL				Lab Sample ID:	GB-9 4
Sample wt/ve	ol:	10.0	(g/mL)	G		Lab File ID:	LUB102.D
Level: (low	v/med)	LOW_				Date Received:	12/18/96
% Moisture:	0		de	canted: (Y/N):	N	Date Extracted:	12/20/96
Concentrated	l Extract Volum	ne:	1000	(uL)		Date Analyzed:	12/26/96
Injection Volu	ıme:	1.0	(uL)			Dilution Factor:	1.0
GPC Cleanup	: (Y/N)	N		:Hq	7		
CA	S No.	Compound		(ւ	Concentrat ug/L or ug/K		Q,
10	8-95-2	Phenol				1900	
		1,2-Dichloro				1000	U
		2-Methylphe				1000	U
		4-Methylphe	enol		· · · · · · · · · · · · · · · · · · ·	1000	U
		Isophorone				1000	U
		1,2,4-Trichl Naphthalene		ne		1000	U
		2-Methylnar				1000	U
		Fluorene	or ici idio i ic			1000	l ü
		bis(2-Ethylh	exyl)phth	alate		3600	
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								GL-SS-G	B-9 8-1
Lab Name	ERM-FAST					Contract:	LUBRIZOL		
Project No	09928.00.0	21	Site	GRINRS	LAG	Location:	FREMONT, OH	Group:	GL-SS
Matrix: (s	soil/water)	SOIL	_				Lab Sample ID:	GB-9 5	
Sample w	t/vol:	10.0	(g mL)	G			Lab File ID:	LUB103.D_	
Level:	(low med)	LOW	_				Date Received:	12/18/96	
% Moistu	re: <u>0</u>	_	d€	ecanted: (Y N):	N	Date Extracted:	12/20/96	
Concentra	nted Extract Volum	me:	1000	_{uL}			Date Analyzed:	12/26/96	
Injection \	/olume:	1.0	(uL)	_			Dilution Factor:	1.0	
GPC Clear	nup: (Y/N)	N	_		pH:	7	-		
						Concentrat	ion Units:		
	CAS No.	Compound			(ι	g/L or ug/K	g) <u>ug/Kg</u>	Q	
ſ	108-95-2	Phenol					1000	U	
Ì	95-50-1	1,2-Dichloro	benzene	<u> </u>			1000	U	
	95-48-7	2-Methylphi	enol				1000	U	
	106-44-5	4-Methylphi	enol				1000	U	
	78-59-1	Isophorone					1000	U	
[120-82-1	1,2,4-Trich	orobenze	ene			1000	U	
	91-20-3	Naphthalene	:				1000	U	
	91-57-6	2-Methylnag	ohthalen	e			1000	U	
[86-73-7	Fluorene					1000	U	
	117-81-7	bis(2-Ethylh	exyl)phtl	halate			1000	U	
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Lab Name:	ERM-FAST		<u>.</u>		Contract:	LUBRIZOL	L	
Project No.:	09928.00.0	1	Site:	GRINRS LAG	Location:	FREMONT, OH	Group:	<u> </u>
Matrix: (soil/v	vater)	WATER	-			Lab Sample ID	WSGB-9	
Sample wt/vol	l:	100.0	(g/mL)	ML		Lab File ID	LUB086.D	
Level: (low/	/med)		-			Date Received	12/18/96	
% Moisture:	100_		de	canted: (Y/N):	N	Date Extracted	12/19/96	
Concentrated I	Extract Volun	ne:	1000	(uL)		Date Analyzed	12/20/96	
Injection Volun	me:	1.0	(uL)		•	Dilution Factor	1.0	
GPC Cleanup:	(Y/N)	N		pH:	7			
					Concentrat	tion Units:		
CAS	No.	Compound		()	ug/L or ug/K	g) <u>ug/L</u>	<u> </u>	
108	-95-2	Phenol				100	U	
95-5	0-1	1,2-Dichlord	benzene			100	U	
95-4	18-7	2-Methylphe	enol			100	U	
106	-44-5	4-Methylphe	enol			100	U	
78-5	59-1	Isophorone				100	U	
120	-82-1	1,2,4-Trichl	orobenze	ene		100	U	
91-2	20-3	Naphthalene			i	100	U	
91-5	7-6	2-Methylnap	hthalene	9		100	U	
86-7	73-7	Fluorene				100	U	
117	-81-7	bis(2-Ethylh	exyl)phti	nalate		100	U	•
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SAMPLE NO.

GL-SS-GB-10 0-2

Lab Name: **ERM-FAST** Contract: LUBRIZOL Group: GL-SS 09928.00.01 Project No.: Site: GRINRS LAG Location: FREMONT, OH SOIL Lab Sample ID: GB-10 1 Matnx: (soil/water) Sample wt.vol: 10.0 (g·mL) G Lab File ID: LUB105.D LOW Date Received: 12/18/96 Level: (low/med) % Moisture: 0 Date Extracted: 12/20/96 decanted: (Y N): N Concentrated Extract Volume: 1000 (uL) Date Analyzed: 12/26/96 Injection Volume: 1.0 Dilution Factor: 1.0 (uL) GPC Cleanup: (Y/N) Ν

		Concentration Units:							
CAS No.	Compound	(ug/L or ug/Kg)	ug/Kg	a					
108-95-2	Phenol	1000		U					
95-50-1	1,2-Dichlorobenzene	1000		U					
95-48-7	2-Methylphenol	1000		U					
106-44-5	4-Methylphenol	1000		U					
78-59-1	Isophorone	1000		U					
120-82-1	1,2,4-Trichlorobenzene	1000		U					
91-20-3	Naphthalene	1000		U					
91-57-6	2-Methylnaphthalene	1000		U					
86-73-7	Fluorene	1000		U					
117-81-7	bis(2-Ethylhexyl)phthalate	1000		U					
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					GL-SS-G	B-10 2-4'
Lab Name: ER	M-FAST		Contract:	LUBRIZOL		
Project No.: 09	928.00.01	Site: GRINRS LAG	Location:	FREMONT, OH	Group:	GL-SS
Matrix: (soil/wate	er) SOIL			Lab Sample ID:	GB-10 2	
Sample wt/vol:	10.0	(g/mL) <u>G</u>		Lab File ID:	LUB106.D	
Level: (low/me	d) LOW_			Date Received:	12/18/96	
% Moisture:	0	decanted: (Y/N):	N	Date Extracted:	12/20/96	
Concentrated Extr	act Volume:	1000_(uL)		Date Analyzed:	12/26/96	
Injection Volume:	1.0	(uL)		Dilution Factor:	1.0	
GPC Cleanup: (Y/I	N)N	pH:	7			
			Concentrat	ion Units:		
CAS No	. Compound	(ug/L or ug/Kg	g) <u>ug/Kg</u>	Ω	
108-95	-2 Phenol			1000	U	
95-50-1	1,2-Dichloro	benzene		1000	U	
95-48-7	2-Methylphe	enol		1000	υ	
106-44	-5 4-Methylphe	enol		1000	U	
78-59-1	Isophorone			1000	U	
120-82	-1 1,2,4-Trichle	orobenzene		1000	U	
91-20-3	Naphthalene			1000	U	
91-57-6	2-Methylnap	hthalene		1000	υ	•
86-73-7				1000	U	
117-81		exyl)phthalate		1000	U	
						
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SAMPLE NO.

GL-SS-GB-10 2-4'DUP

Lab Name: E	RM-FAST				Contract:	LUBRIZOL	<u></u>
Project No.: 0	9928.00.01		Site: <u>G</u>	RINRS LAG	Location:	FREMONT, OH	Group: GL-SS
Matrix: rsoil wa	ater) _	SOIL	_			Lab Sample ID:	GB-10 2D
Sample wt vol:	_	10.0	Ig mL) G			Lab File ID:	LUB110.D
Level: (low/m	ned)	LOW	_			Date Received:	12/18/96
% Moisture:	0		deca	nted: (Y N):	N	Date Extracted:	12/20/96
Concentrated Ex	ctract Volume	: :	_1000_(u	ıL)		Date Analyzed:	12/26/96
Injection Volume	e: _	1.0	_ (uL)			Dilution Factor:	1.0
GPC Cleanup: (Y	(/N) _	N	_	pH:	7		·

78-59-1 Isophorone 1000 U 120-82-1 1,2,4-Trichlorobenzene 1000 U 91-20-3 Naphthalene 1000 U 91-57-6 2-Methylnaphthalene 1000 U 86-73-7 Fluorene 1000 U			Concentration Units:			
95-50-1 1,2-Dichlorobenzene 1000 U 95-48-7 2-Methylphenol 1000 U 106-44-5 4-Methylphenol 1000 U 78-59-1 Isophorone 1000 U 120-82-1 1,2,4-Trichlorobenzene 1000 U 91-20-3 Naphthalene 1000 U 91-57-6 2-Methylnaphthalene 1000 U 86-73-7 Fluorene 1000 U	CAS No.	Compound	(ug/L or ug/Kg)	ug/Kg	a	
95-48-7 2-Methylphenol 1000 U 106-44-5 4-Methylphenol 1000 U 78-59-1 Isophorone 1000 U 120-82-1 1,2,4-Trichlorobenzene 1000 U 91-20-3 Naphthalene 1000 U 91-57-6 2-Methylnaphthalene 1000 U 86-73-7 Fluorene 1000 U	108-95-2	Phenol	1000		U	
106-44-5 4-Methylphenol 1000 U 78-59-1 Isophorone 1000 U 120-82-1 1,2,4-Trichlorobenzene 1000 U 91-20-3 Naphthalene 1000 U 91-57-6 2-Methylnaphthalene 1000 U 86-73-7 Fluorene 1000 U	95-50-1	1,2-Dichlorobenzene	1000		U	
78-59-1 Isophorone 1000 U 120-82-1 1,2,4-Trichlorobenzene 1000 U 91-20-3 Naphthalene 1000 U 91-57-6 2-Methylnaphthalene 1000 U 86-73-7 Fluorene 1000 U	95-48-7	2-Methylphenol	1000		U	
120-82-1 1,2,4-Trichlorobenzene 1000 U 91-20-3 Naphthalene 1000 U 91-57-6 2-Methylnaphthalene 1000 U 86-73-7 Fluorene 1000 U	106-44-5	4-Methylphenol	1000		U	
91-20-3 Naphthalene 1000 U 91-57-6 2-Methylnaphthalene 1000 U 86-73-7 Fluorene 1000 U	78-59-1	Isophorone	1000		U	
91-57-6 2-Methylnaphthalene 1000 U 86-73-7 Fluorene 1000 U	120-82-1	1,2,4-Trichlorobenzene	1000		U	
86-73-7 Fluorene 1000 U	91-20-3	Naphthalene	1000		U	
	91-57-6	2-Methylnaphthalene	1000		U	
117-81-7 bis(2-Ethythexyliphthalate 1000 U	86-73-7	Fluorene	1000		U	
	117-81-7	bis(2-Ethylhexyl)phthalate	1000		U	
						
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Lab Name: ERM-FAST	Г		Contract:	LUBRIZOL	GL-SS-G	B-10 4-6'
Project No.: 09928.00		Site: GRINRS LAG	Location:	FREMONT, OH	Group:	GL-SS
Matrix: (soil/water)	SOIL			Lab Sample ID:	GB-10 3	
Sample wt/vol:	10.0	(g/mL) <u>G</u>		Lab File ID:	LUB107.D	
Level: (low/med)	LOW			Date Received:	12/18/96	•
% Moisture: 0		decanted: (Y/N):	N	Date Extracted:	12/20/96	
Concentrated Extract Vol	lume:	1000 (uL)		Date Analyzed:	12/26/96	
Injection Volume:	1.0	_(uL)		Dilution Factor:	1.0	
GPC Cleanup: (Y/N)	N	pH:	7			
			Concentrat			
CAS No.	Compound	((ug/L or ug/K		α	
108-95-2	Phenol			1000	U	
95-50-1	1,2-Dichlord			1000	U	
95-48-7	2-Methylphe			1000	U	
106-44-5	4-Methylph	enol		1000	U	
78-59-1	Isophorone	_ 	ļ	1000	U	
120-82-1	1,2,4-Trichl			1000	U	
91-20-3	Naphthalene		<u>-</u>	1000	U	
91-57-6 86-73-7	2-Methylna Fluorene	phulalerie		1000	U	
117-81-7		exyl)phthalate		1000	U	
117017	DISTE ETTYTT	схупринаше		1000	<u>-</u>	
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SAMPLE NO.

GL-SS-GB-10 6-8'

Lab Name:	ERM-FAST			Contract:	LUBRIZOL		
Project No.:	09928.00.0	1	Site: GRINRS LAG	Location:	FREMONT, OH	Group: GL-	SS
Matnx: Isoil	water)	SOIL	_		Lab Sample ID:	GB-10 4	
Sample wt/vo	ol:	10.0	_ig mL) <u>G</u>		Lab File ID:	LUB108.D_	
Level: (low	r/med)	LOW	_		Date Received:	12/18/96	
% Moisture:	0		decanted: (Y N):	N	Date Extracted:	12/20/96	
Concentrated	Extract Volum	ne:	1000 (uL)		Date Analyzed:	12/26/96	
Injection Volu	ıme:	1.0	_(uL)		Dilution Factor:	1.0	
GPC Cleanup	: (Y/N)	N	_ pH:	7			
				Concentration	on Units:		
CA	S No.	Compound	(ug/L or ug/Kg) <u>ug/Kg</u>	Q	
10	R-95-2	Phenoi		T	1000	U	

		Concentration orats.	
CAS No.	Compound	(ug/L or ug/Kg) ug/I	(g Q
108-95-2	Phenol	1000	U
95-50-1	1,2-Dichlorobenzene	1000	U
95-48-7	2-Methylphenol	1000	U
106-44-5	4-Methylphenol	1000	U
78-59-1	Isophorone	1000	U
120-82-1	1,2,4-Trichlorobenzene	1000	U
91-20-3	Naphthalene	1000	U
91-57-6	2-Methylnaphthalene	1000	U
86-73-7	Fluorene	1000	U
117-81-7	bis(2-Ethylhexyl)phthalate	1000	U
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Lab Name	ERM-FAST			Contract:	LUBRIZOL	GL-SS-GI	B-10 8-10'
Project No	o.: 09928.00.0	<u>)</u> 1	Site: GRINRS LA	G Location:	FREMONT, OH	Group:	GL-SS
Matrix: (s	soil/water)	SOIL			Lab Sample ID:	GB-10 5	
Sample w	t/vol:	10.0	(g/mL) G		Lab File ID:	LUB109.D	
Level: (low/med)	LOW	_		Date Received:	12/18/96	
% Moistu	re: <u> </u>	_	decanted: (Y/I	N): N	Date Extracted:	12/20/96	
Concentra	ted Extract Volu	me:	1000_ (uL)		Date Analyzed:	12/26/96	
Injection V	/olume:	1.0	_(uL)		Dilution Factor:	1.0	
GPC Clear	oup: (Y/N)	N	_ p	H: 7			
				Concentrat	tion Units:		
	CAS No.	Compound		(ug/L or ug/K	g) <u>ug/Kg</u>	a	
ſ	108-95-2	Phenol			1000	U	
[95-50-1	1,2-Dichlord	benzene		1000	U ,	
[95-48-7	2-Methylpho	enol		1000	U	
-	106-44-5	4-Methylphe	enol		1000	U	
<u> </u>	78-59-1	Isophorone			1000	U	
	120-82-1	1,2,4-Trichl			1000	U	
<u>-</u>	91-20-3	Naphthalene			1000	U	•
	91-57-6	2-Methylna	hthalene		1000	U	
<u> -</u>	86-73-7	Fluorene			1000	U	
	117-81-7	bis(2-Ethyin	exyl)phthalate		1000	U	
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SAMPLE NO.

GL-WS-GB-10

ab Name: ERM-FAST				Contract:	LUBRIZOL	
Project No.: 09928.00.0	21	Site:	GRINRS LAG	Location:	FREMONT, OH	Group:
Matrix: (soil/water)	WATER	_			Lab Sample ID:	WSGB-10
Sample wt vol:	100.0	(g mL)	ML		Lab File ID:	LUB087.D
.evel: (low/med)		-			Date Received:	12/18/96
Moisture: 100	-	de	ecanted: (Y N):	<u> </u>	Date Extracted:	12/19/96
Concentrated Extract Volum	me:	1000	_{uL+		Date Analyzed:	12/20/96
njection Volume:	1.0	(uL)			Dilution Factor:	1.0
GPC Cleanup: (Y/N)	N	_	pH:	7		
				Concentrati	ion Units:	
CAS No.	Compound		(ug/L or ug/Ko	g) <u>ug/L</u>	<u> </u>
108-95-2	Phenol				100	υ
95-50-1	1,2-Dichloro		:	Ļ	100	U
95-48-7	2-Methylphe			ļ	100	U
106-44-5	4-Methylphe	enol		}	100	U
78-59-1	1,2,4-Trichl	orobooze		 	100	U
120-82-1 91-20-3	Naohthalene				100	U
91-57-6	2-Methylnag			<u> </u>	100	- "
86-73-7	Fluorene	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		 	100	Ü
117-81-7	bis(2-Ethylh	exyl)phti	nalate	<u> </u>	100	Ü
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Lab Name: ERM-FAST			Contract:	LUBRIZOL	
Project No.: 09928.00.0	21	Site: GRINRS LAG	Location:	FREMONT, OH	Group: GL-SS
Matrix: (soil/water)	SOIL	-		Lab Sample ID:	GB-11 1
Sample wt/vol:	10.0	(g/mL) G		Lab File ID:	LUB111.D
Level: (low/med)	LOW	_		Date Received:	12/18/96
% Moisture: 0	-	decanted: (Y/N):	N	Date Extracted:	12/20/96
Concentrated Extract Volu	me:	1000 (uL)		Date Analyzed:	12/26/96
Injection Volume:	1.0	(uL)		Dilution Factor:	1.0
GPC Cleanup: (Y/N)	N_	pH:	7		
			Concentrati	on Units:	
CAS No.	Compound	(t	ıg/L or ug/Kç	ug/Kg	Q
108-95-2	Phenol			1000	U
95-50-1	1,2-Dichlord	benzene		1000	U
95-48-7	2-Methylphe			1000	U ,
106-44-5	4-Methylpho	enol		1000	U
78-59-1	Isophorone	· · · · · · · · · · · · · · · · · · ·		1000	U
120-82-1	1,2,4-Trichl			1000	U
91-20-3	Naphthalene			1000	U
91-57-6	2-Methylna	ontnaiene		1000	U
86-73-7	Fluorene			1000	U
117-81-7	bis(2-Ethyin	exyl)phthalate		1000	
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SAMPLE NO.

GL-SS-GB-11 2-4'

Lab Name:	ERM-FAST	_			Contract:	LUBRIZOL	GL-SS-G	iB-1 ∠⊣
Project No.	09928.00.0	1	Site:	GRINRS LAG	Location:	FREMONT, OH	Group:	GL-SS
Matnx: (sc	id/water)	SOIL	_			Lab Sample ID:	GB-11 2	•
Sample wt	vol:	100	(g mL)	<u>G</u>		Lab File ID:	LUB112.D	
Level: (lo	ow/med)	LOW				Date Received:	12/18/96	
% Moisture	e:0		de	canted: (Y/N):	. N	Date Extracted:	12/20/96	•
Concentrate	ed Extract Volun	ne:	1000	(uL)		Date Analyzed:	12/26/96	
Injection Vo	olume:	1.0	(uL)	-		Dilution Factor:	1.0	
GPC Cleans	.ap: (Y/N)	N	•	pH:	: 7			="
			•	·	Concentration	on Units:		
C	AS No.	Compound		(ug/L or ug/Kg) <u>ug/Kg</u>	a	
Ī	08-95-2	Phenol				1000	U	1
9	5-50-1	1,2-Dichloro	benzene			1000	U	ł
9	5-48-7	2-Methylphe	enol			1000	U]
1	06-44-5	4-Methylphe	enol			1000	Ū]
7	8-59-1	Isophorone				1000	Ü	1
1	20-82-1	1,2,4-Trichk	orobenze	ne		1000	U	1
9	1-20-3	Naphthalene	:			1000	U	1
		2-Methylnap				1000	Ú	1
 	6-73-7	Fluorene				1000	Ü	
		bis(2-Ethylhi	exyl)phtl	valate		1000	U	
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Lab Nam	e: ERM-FAS	T		Contract:	LUBRIZOL	GL-SS-C	SB-11 4-6'
	lo.: 09928.00		Sito: GRINDS I A			Craum.	CL SS
-			Site: GHINNS LA	a Location:	FREMONT, OH	Group:	
Matrix: ((soil/water)	SOIL			Lab Sample ID:	GB-11 3	. '
Sample v	vt/vol:	10.0	(g/mL) G		Lab File ID:	LUB113.D	-
Level:	(low/med)	LOW			Date Received:	12/18/96	
% Moistu	ure: 0		decanted: (Y/N): <u>N</u>	Date Extracted:	12/20/96	-
Concentra	ated Extract Vo	olume:	1000 (uL)		Date Analyzed:	12/26/96	_
Injection	Volume:	1.0	(uL)		Dilution Factor:	1.0	_
GPC Clea	nup: (Y/N)	N	pH	l: <u>7</u>			
-				Concentrat	tion Units:		
	CAS No.	Compound		(ug/L or ug/K	g) <u>ug/Kg</u>	a	
	108-95-2	Phenol			1000	U]
	95-50-1	1,2-Dichloro	benzene		1000	U	
	95-48-7	2-Methylphe			1000	U	i
	106-44-5	4-Methylphe	nol	<u></u>	1000	U	1
	78-59-1	Isophorone			1000	U	ļ
•	120-82-1	1,2,4-Trichle		<u> </u>	1000	U	1
	91-20-3	Naphthalene			1000	U	
	91-57-6	2-Methylnap	nthalene		1000	U	
	86-73-7 117-81-7	Fluorene	exyl)phthalate		1000	U	+
	117-01-7	DIS(2-Ethylni	exymphimalate		1000		
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SAMPLE NO.

GL-SS-GB-11 6-8'

							GE-33-0	D-110
.ab Name:	ERM-FAST				Contract:	LUBRIZOL		
Project No.:	09928.00.0	1	Site:	GRINRS LAG	Location:	FREMONT, OH	Group:	GL-SS
Matnx: (soi	l/water)	SOIL	-			Lab Sample ID:	GB-11 4	
Sample wt.v	vol:	10.0	ig mL)	G		Lab File ID:	LUB114.D	
.evel: (lo	w/med)	LOW				Date Received:	12/18/96	
% Moisture:	0	_	de	canted: (Y N):	N	Date Extracted:	12/20/96	
Concentrate	d Extract Volum	me:	1000	(uL)		Date Analyzed:	12/26/96	
njection Vol	lume:	1.0	(uL)			Dilution Factor:	1.0	•
SPC Cleanu	p: (Y/N)	N		pH:	7			
					Concentrat	ion Units:		
C	AS No.	Compound		(ug/L or ug/K	g) <u>ug/Kg</u>	a	
10	08-95-2	Phenol				1000	Ū	
⊢	5-50-1	1,2-Dichlord	benzene		<u> </u>	1000	U	
95	5-48-7	2-Methylphe	enol			1000	U	
10	6-44-5	4-Methylphe	enol			1000	U	
78	3-59-1	Isophorone				1000	U	
12	20-82-1	1,2,4-Trichl	orobenze	ne		1000	U	
	-20-3	Naphthalene				1000	U	
91	-57-6	2-Methylnag	ohthalene	<u> </u>		1000	U	
<u> </u>	5-73-7	Fluorene				1000	U	
11	7-81-7	bis(2-Ethylh	exyl)phth	alate		1000	U	
								
								
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Lab Name:	ERM-FAST			Cont	tract: LUBI	RIZOL	GL-SS-GI	3-11 8-10'
Project No.:	09928.00.0	1	Site: GRINRS				Group:	GL-SS
Matrix: (soil,	/water)	SOIL				Lab Sample ID:	GB-11 6	-
Sample wt/v	ol:	10.0	(g/mL) <u>G</u>	<u> </u>		Lab File ID:	LUB117.D	
Level: (low	v/med)	LOW				Date Received:	12/18/96	
% Moisture:	0		decanted: (Y/N):N	V	Date Extracted:	12/20/96	
Concentrated	Extract Volum	ne:	1000 (uL)		•	Date Analyzed:	12/27/96	
Injection Volu	ume:	1.0	(uL)			Dilution Factor:	1.0	
GPC Cleanup	o: (Y/N)	N		pH:	<u>7</u>			
CA	S No.	Compound			centration Un r ug/Kg)	nits: ug/Kg	Q	
10	8-95-2	Phenol			10	000	U	
	-50-1	1,2-Dichloro	benzene			000	U	
95	-48-7	2-Methylphe			10	000	υ	
10	6-44-5	4-Methylphe	enol		10	000	U	•
78	-59-1	Isophorone			10	000	U	
	0-82-1	1,2,4-Trichle	orobenzene		10	000	U	
91	-20-3	Naphthalene			10	000	U	
	-57-6	2-Methylnar	hthalene		10	000	U	
		Fluorene	··· ··· ······		10	000	U	
11	7-81-7	bis(2-Ethylhe	exyl)phthalate		10	000	U	
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SAMPLE NO.

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Lab Name:	ERM-FAST				Contract:	LUBRIZOL		
Project No.:	09928.00.0	21	Site: G	RINRS LAG	Location:	FREMONT, OH	Group:	
Matnx: (soil	/water)	WATER	_			Lab Sample ID:	WSGB-11	
Sample wt'v	ol:	100.0	(g mL) <u>M</u>	<u>IL</u>		Lab File ID:	LUB088.D	-
Level: flov	w/med)	·	-			Date Received:	12/19/96	
% Moisture:	100		deca	nted: (Y N):	N_	Date Extracted:	12/19/96	
Concentrated	d Extract Volu	ne:	1000 (JL)		Date Analyzed:	12/20/96	
Injection Volu	ume:	1.0	(uL)			Dilution Factor:	1.0	
GPC Cleanup	o: (Y/N)	N	_	pH:	7			
					Concentrat	ion Units:		
CA	No.	Compound		((ug/Lorug/Ko	g) <u>ug/L</u>	Q	
10	8-95-2	Phenol				100	U]
95	-50-1	1,2-Dichlord	benzene			100	U	1
95	-48-7	2-Methylph	enoi			100	U	1
10	6-44-5	4-Methylphi	enol			100	U	1
78	-59-1	Isophorone		_		100	U	
12	0-82-1	1,2,4-Trich	orobenzene			100	U	
91	-20-3	Naphthalene	•			100	U	1
91	-57-6	2-Methylna	ohthalene			100	U	
86	-73-7	Fluorene				100	U]
11	7-81-7	bis(2-Ethylh	exyl)phthal	ate		100	U]
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Lab Name	e: ERM-FAST			Contract:	LUBRIZOL	GL-SS-GB	-12 0-2'
Project N	o.: 09928.00.	01	Site: GRINRS LAG	Location:	FREMONT, OH	Group: G	L-SS
Matrix: (soil/water)	SOIL	_		Lab Sample ID:	GB-12 1	•
Sample w	vt/vol:	10.0	(g/mL) <u>G</u>		Lab File ID:	LUB118.D	
Level:	(low/med)	LOW	_		Date Received:	12/18/96	
% Moistu	ıre: 0	_	decanted: (Y/N):	N	Date Extracted:	12/20/96	
Concentra	ated Extract Volu	ıme:	1000 (uL)		Date Analyzed:	12/27/96	
Injection '	Volume:	1.0	_(uL)		Dilution Factor:	1.0	
GPC Clea	nup: (Y/N)	N	_ pH:	7			
				Concentrat	ion Units:		
	CAS No.	Compound	(t	ug/L or ug/K	g) <u>ug/Kg</u>	a	
	108-95-2	Phenol	· · · · · · · · · · · · · · · · · · ·		1000	U	
	95-50-1	1,2-Dichlord	benzene		1000	U	
	95-48-7	2-Methylphe	enol		1000	U	
	106-44-5	4-Methylpho	enol		1000	U	
	78-59-1	Isophorone			1000	U	
	120-82-1	1,2,4-Trichl	orobenzene		1000	υ	
	91-20-3	Naphthalene)		1000	U	
	91-57-6	2-Methylnar	ohthalene		1000	U	
	86-73-7	Fluorene			1000	U	
	117-81-7	bis(2-Ethylh	exyl)phthalate		1000	U	
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SAMPLE NO.

GL.SS.GR.12 2.41

Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GL-55-0	3B-12
Project No.:	09928.00.0)1	Site	GRINRS LAG	Location:	FREMONT, OH	Group:	GL-S
Matrix: (so	il/water)	SOIL	_			Lab Sample ID:	GB-12 2	_
Sample wt	vol:	10.0	(g mL)	G		Lab File ID:	LUB119.D	_
Level: (lo	w⊬med)	LOW	-			Date Received:	12/18/96	•
% Moisture	: o _		- dı	ecanted: (Y N):	N	Date Extracted:	12/20/96	_
Concentrate	ed Extract Volum	ne:	1000	(uL)		Date Analyzed:	12/27/96	_
Injection Vo	lume:	1.0	(uL)	-		Dilution Factor:	1.0	
GPC Cleanu	ip: (Y/N)	N	-	pH:	7			•
			-		Concentration	on Units:		
C	AS No.	Compound		(ug/L or ug/Kg) <u>ug/Kg</u>	Q	
11	08-95-2	Phenol			<u> </u>	1000	U	1 `
9	5-50-1	1,2-Dichlord	benzene			1000	U]
9:	5-48-7	2-Methylphe	enol	<u>.</u>		1000	U]
10	06-44-5	4-Methylphe	enol			1000	U]
78	8-59-1	Isophorone				1000	U]
1:	20-82-1	1,2,4-Trichl	orobenze	ene		1000	U]
9	1-20-3	Naphthalene				1000	U]
9	1-57-6	2-Methylnar	ohthalen	e		1000	U]
80	6-73-7	Fluorene				1000	U]
1	17-81-7	bis(2-Ethylh	exyl)pht	nalate		1000	Ú]
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SAMPLE NO

GI -SS-GB-12 4-6'

					_		GL-SS-G	B-12 4-6
Lab Name:	ERM-FAST				Contract:	LUBRIZOL		
Project No.:	09928.00.0	1	Site	GRINRS LAG	Location:	FREMONT, OH	Group:	GL-SS
Matrix: (soil	l/water)	SOIL_	_			Lab Sample ID:	GB-12 3	
Sample wt/v	vol:	10.0	(g/mL)	G		Lab File ID:	LUB120.D	
Level: (lo	w/med)	LOW	-			Date Received:	12/18/96	
% Moisture:	0		de	ecanted: (Y/N):	N	Date Extracted:	12/20/96	
Concentrate	d Extract Volun	ne:	1000	_(uL)		Date Analyzed:	12/27/96	
Injection Vol	ume;	1.0	(uL)			Dilution Factor:	1.0	•
GPC Cleanup	o: (Y/N)	N	_	pH:	7			
	•		-		Concentrat	ion Units:		
CA	AS No.	Compound		(t	ıg/L or ug/K		Q	
		Phenol				1000	U	
	5-50-1	1,2-Dichlord	henzene	<u> </u>		1000	U	
		2-Methylphe		<u></u>		1000	Ü	
<u> </u>		4-Methylphe				1000	Ü	
		Isophorone				1000	Ü	
	20-82-1	1,2,4-Trichl	orobenze	ene		1000	U	
		Naphthalene		 	k. –	1000	U	
		2-Methylnar		e		1000	U	
		Fluorene				1000	Ü	
11	7-81-7	bis(2-Ethylh	exyl)pht	halate		1000	U	
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SAMPLE NO.

12 6-8'

		J.		THE OTHER IN	00 / 11 12 1 01		GL-SS-G	SB-12 6
Lab Nam	e: ERM-FAST	-			Contract:	LUBRIZOL	-	
Project N	o.: <u>09928.00</u> .	<u>0</u> 1	Site	GRINRS LAG	Location:	FREMONT, OH	Group:	GL-SS
Matnx: ((soil/water)	SOIL	_			Lab Sample ID:	GB-12 4	-
Sample v	vt∂vol:	10.0	_(g/mL)	G		Lab File ID:	LUB121.D	_
Level:	(low/med)	LOW				Date Received:	12/18/96	
% Moistu	.re : 0		– de	ecanted: (Y-N)	: N	Date Extracted:	12/20/96	•
Concentr	ated Extract Volu	_				Date Analyzed:		-
	Volume:	1.0				Dilution Factor:		-
			_ (02)		~	Charles 1 deter.	1.0	-
GPC Clea	inup: (Y/N)	N	-	рн	7			
	CAC 11.	C			Concentrat		0	
	CAS No.	Compound	_		(ug/L or ug/K	<u> </u>	<u> </u>	1
	108-95-2	Phenol			↓	1000	U	ł
	95-50-1	1,2-Dichlor		<u> </u>	ļ	1000	U	Į
	95-48-7	2-Methylph		-	-	1000	U	ł
	106-44-5	4-Methylph				1000	U	-
	78-59-1	Isophorone				1000	U	ł
	120-82-1	1,2,4-Trich		ene	-	1000	U	ł
	91-20-3	Naphthalen			 	1000	U	ł
	91-57-6	2-Methylna	pritnalen	e	 	1000	U	١.
	86-73-7	Fluorene		h -1 - a -	 	1000	U	1
	117-81-7	bis(2-Ethyli	exyi)pnt	navate	 	1000	<u> </u>	┨
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SAMPLE NO.

			_		GL-SS-GF	3-12 8-10'
_	RM-FAST		Contract:	LUBRIZOL		
Project No.: 09	9928.00.01	Site: GRINRS LAG	Location:	FREMONT, OH	Group: _	GL-SS
Matrix: (soil/wat	ter) SOIL			Lab Sample ID:	GB-12 5	
Sample wt/vol:	10.0	(g/mL) G		Lab File ID:	LUB122.D	
Level: (low/me	ed) LOW			Date Received:	12/18/96_	
% Moisture:	0	decanted: (Y/N):	<u>N</u>	Date Extracted:	12/20/96	•
Concentrated Ex	tract Volume:	1000(uL)		Date Analyzed:	12/27/96	
Injection Volume	: <u>1.0</u>	(uL)		Dilution Factor:	1.0	
GPC Cleanup: (Y	/N) N	pH:	7			
			Concentrati	ion Units:		
CAS N		(1	ug/L or ug/Kg	ug/Kg	<u> </u>	
108-9				1000	U	
95-50-				1000	U	
95-48-				1000	U	
106-44		enol		1000	U	
78-59-				1000	U	
120-8:				1000	U	
91-20-				1000	U	
91-57- 86-73-		ntnaiene		1000	U	
117-8		avullahthalata	L	1000	U	
117-8	1-7 DIS(Z-Ethylni	exyl)phthalate		1000		
 						
 					 	
						
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Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GL-WS	-GB-1
Project No.	09928.00.0	1	Site	GRINRS LAG	Location:	FREMONT, OH	Group:	
Matrix: (so	d/water)	WATER	_			Lab Sample ID:	WSGB-12	
Sample wt/	vol:	100.0	ig mL)	ML		Lab File ID:	LUB090.D	
Level: (lo	ow med)		_	_		Date Received:	12/19/96	•
% Moisture	100		de	ecanted: (Y N):	N	Date Extracted:	12/19/96	
Concentrate	ed Extract Volum	ne:	1000	_(uL)		Date Analyzed:	12/20/96	
Injection Vo	olume:	1.0	(uL)			Dilution Factor:	1.0	
GPC Cleanu	ip: (Y/N)	N	_	pH:	7			
С	AS No.	Compound		(1	Concentrati ug/L or ug/Kg		Q	
l I		Phenol		· 	1	100	U	
_	5-50-1	1,2-Dichlord	benzene		 -	100	l ü	
<u>. </u>	5-48-7	2-Methylph				100	U	
<u> </u>		4-Methylph				100	U	
7	8-59-1	Isophorone				100	U	
1	20-82-1	1,2.4-Trichl	orobenze	ene		100	U	
9	1-20-3	Naphthalene				100	U_	
		2-Methylnag	ohthalen	e		100	U	
<u></u>		Fluorene				100	U	
	17-81-7	bis(2-Ethylh	exyl)phti	halate		100	U	
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SAMPLE NÒ.

					GL-SS-GB-13 0-2'
Lab Name: ERM-FAST		·	Contract:	LUBRIZOL	
Project No.: 09928.00.	<u>0</u> 1	Site: GRINRS LAG	Location:	FREMONT, OH	Group: GL-SS
Matrix: (soil/water)	SOIL	-		Lab Sample ID:	GB-13 1
Sample wt/vol:	10.0	(g/mL) G		Lab File ID:	LUB123.D
Level: (low/med)	LOW	_		Date Received:	12/18/96_
% Moisture:0	_	decanted: (Y/N)	: <u>N</u>	Date Extracted:	12/20/96
Concentrated Extract Volu	ıme:			Date Analyzed:	12/27/96
Injection Volume:	1.0	(uL)		Dilution Factor:	1.0
GPC Cleanup: (Y/N)	N	рН	:7		
			Concentrat	ion Units:	
CAS No.	Compound		(ug/L or ug/K	g) <u>ug/Kg</u>	Q
108-95-2	Phenol		1	1000	U
95-50-1	1,2-Dichloro	benzene		1000	U
95-48-7	2-Methylphe	enol		1000	U
106-44-5	4-Methylphe	enol		1000	U
78-59-1	Isophorone			1000	U .
120-82-1	1,2,4-Trichl	orobenzene		1000	υ
91-20-3	Naphthalene			1000	U
91-57-6	2-Methylnap	hthalene		1000	U
86-73-7	Fluorene	_		1000	U
117-81-7	bis(2-Ethylh	exyl)phthalate		1000	U
					
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SAMPLE NO.

GL-SS-GB-13 2-4'

ERM-FAST LUBRIZOL Lab Name: Contract: Project No.: 09928.00.01 Site: GRINRS LAG Location: FREMONT, OH Group: GL-SS Matrix: (soil:water) SOIL Lab Sample ID: GB-13 2 10.0 Lab File ID: LUB124.D Sample wt.vol: (g mL) G LOW Level: (low/med) Date Received: 12/18/96 decanted: (Y N): ____ N Date Extracted: 12/20/96 % Moisture: 0 Concentrated Extract Volume: 1000 (uL) Date Analyzed: 12/27/96 Dilution Factor: 1.0 Injection Volume: 1.0 (uL) GPC Cleanup: (Y/N) Ν

		Concentration Units:					
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	a				
108-95-2	Phenol	1000	U				
95-50-1	1,2-Dichlorobenzene	1000	U				
95-48-7	2-Methylphenol	1000	U				
106-44-5	4-Methylphenol	1000	U				
78-59-1	Isophorone	1000	U				
120-82-1	1,2,4-Trichlorobenzene	1000	U				
91-20-3	Naphthalene	1000	U				
91-57-6	2-Methylnaphthalene	1000	U				
86-73-7	Fluorene	1000	U				
117-81-7	bis(2-Ethylhexyl)phthalate	1000	U				

		02	MINOCATILL ONGA!	NICS ANALTSI	S DATA SHEET	
Lab Name:	ERM-FAST			Contract:	LUBRIZOL	GL-SS-GB-13 4-6'
Project No.:	09928.00.0	<u>)</u> 1	Site: GRINRS LA	G Location:	FREMONT, OH	Group: GL-SS
Matrix: (soi	il/water)	SOIL			Lab Sample ID:	GB-13 3
Sample wt/v	vol:	10.0	(g/mL) <u>G</u>		Lab File ID:	LUB125.D
Level: (lo	w/med)	LOW			Date Received:	12/18/96
% Moisture:	: 0	_	decanted: (Y/N	N): N	Date Extracted:	12/20/96_
Concentrate	d Extract Volu	me:	1000 (uL)		Date Analyzed:	12/27/96
Injection Vol	lume:	1.0	(uL)		Dilution Factor:	1.0
GPC Cleanu	p: (Y/N)	<u>N</u>	р	H:7		
				Concentrat		
	AS No.	Compound		(ug/L or ug/K	g) <u>ug/Kg</u>	Ω
10	08-95-2	Phenol			1000	U
95	5-50-1	1,2-Dichloro	benzene		1000	U
95	5-48-7	2-Methylphe	nol		1000	U
10	06-44-5	4-Methylphe	nol		1000	<u> </u>
78	8-59-1	Isophorone			1000	U
12	20-82-1	1,2,4-Trichlo	orobenzene		1000	U
91	1-20-3	Naphthalene			1000	U
91	1-57-6	2-Methylnap	hthalene		1000	U
86	6-73-7	Fluorene			1000	U
11	17-81-7	bis(2-Ethylhe	exyl)phthalate		1000	U .
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SAMPLE NO.

GL-SS-GB-13 6-8'

Lab Name:	ERM-FAST				Contract:	LUBRIZOL		
Project No.:	09928.00.0	1	Site:	GRINRS LAC	Location:	FREMONT, OH	Group: G	L-S
Matnx: (soil/	water)	SOIL	_			Lab Sample ID:	GB-13 4	
Sample wt/vo	xi:	10.0	(g·mL)	<u>G</u>		Lab File ID:	LUB126.D	
Level: (low	'med)	LOW	_			Date Received:	12/18/96	
% Moisture:	0		de	canted: (Y 'N)	: <u>N</u>	Date Extracted:	12/20/96	
Concentrated	Extract Volum	ne:	1000	(uL)		Date Analyzed:	12/27/96	
Injection Volu	me:	1.0	(uL)			Dilution Factor:	1.0	
GPC Cleanup:	: (Y/N)	N	_	рН	l: 7			•
					Concentra	tion Units:		
CAS	S No.	Compound			(ug/L or ug/K	.g) ug/Kg	<u> </u>	

	Concentration Units:								
CAS No.	Compound	(ug/Lorug/Kg) ug/Kg	_ a						
108-95-2	Phenol	1000	U						
95-50-1	1,2-Dichlorobenzene	1000	U						
95-48-7	2-Methylphenol	1000	U						
106-44-5	4-Methylphenol	1000	U						
78-59-1	Isophorone	1000	U						
120-82-1	1,2,4-Trichlorobenzene	1000	U						
91-20-3	Naphthalene	1000	U						
91-57-6	2-Methylnaphthalene	1000	U						
86-73-7	Fluorene	1000	U						
117-81-7	bis(2-Ethylhexyl)phthalate	1000	U						
									

SAMPLE NO

GL-SS-GB-13 8-10'

					GE-33-GD-13 0-10
Lab Name: ERM-FAST	·· <u>·</u>	·	Contract:	LUBRIZOL	L
Project No.: 09928.00.	01	Site: GRINRS LAG	Location:	FREMONT, OH	Group: GL-SS
Matrix: (soil/water)	SOIL	_		Lab Sample ID:	GB-13 5
Sample wt/vol:	10.0	(g/mL) G		Lab File ID:	LUB127.D
Level: (low/med)	LOW	_		Date Received:	12/18/96
% Moisture: 0	- -	decanted: (Y/N):	N	Date Extracted:	12/20/96
Concentrated Extract Volu	ıme:	_1000_(uL)		Date Analyzed:	12/27/96
Injection Volume:	1.0	_(uL)		Dilution Factor:	1.0
GPC Cleanup: (Y/N)	N	_ pH:	7		
			Concentrat	ion Units:	
040 11-	C	1.		-\ <i>\\</i>	^

Compound	(ug/L or ug/Kg)	ug/Kg	Q
Phenol	1000		U
1,2-Dichlorobenzene	1000		U
2-Methylphenol	1000		U
4-Methylphenol	1000		U
Isophorone	1000		U
1,2,4-Trichlorobenzene	1000)	U
Naphthalene	1000		U
2-Methylnaphthalene	1000)	U
Fluorene	1000)	U
bis(2-Ethylhexyl)phthalate	1000		U
			
	1	1	
	Phenol 1,2-Dichlorobenzene 2-Methylphenol 4-Methylphenol Isophorone 1,2,4-Trichlorobenzene Naphthalene 2-Methylnaphthalene	Phenol 1000 1,2-Dichlorobenzene 1000 2-Methylphenol 1000 4-Methylphenol 1000 Isophorone 1000 1,2,4-Trichlorobenzene 1000 Naphthalene 1000 2-Methylnaphthalene 1000 Fluorene 1000	Phenol 1000 1,2-Dichlorobenzene 1000 2-Methylphenol 1000 4-Methylphenol 1000 Isophorone 1000 1,2,4-Trichlorobenzene 1000 Naphthalene 1000 2-Methylnaphthalene 1000 Fluorene 1000

SAMPLE NO.

GL-SS-GB-13 10-12'

Lab Name	: <u>ERM-FAST</u>				Contract:	LUBRIZOL		
Project No	o.: <u>09928.00.</u>	<u>0</u> 1	Site:	GRINRS LAC	G Location:	FREMONT, OH	Group:	GL-SS
Matrix: (s	oil/water)	SOIL	_			Lab Sample ID:	GB-13 6	
Sample w	t.vol:	10.0	(g·mL)	G		Lab File ID:	LUB128.D	
Level: (low/med)	LOW	_			Date Received:	12/18/96	
% Moistui	re: 0	-	dec	anted: (Y/N): <u>N</u>	Date Extracted:	12/20/96	
Concentra	ted Extract Volu	me:	1000	(uL)		Date Analyzed:	12/27/96	
Injection \	/olume:	1.0	_ (uL)			Dilution Factor:	1.0	
GPC Clear	nup: (Y/N)	N	_	рŀ	l:			
					Concentrat	ion Units:		
	CAS No.	Compound			(ug/L or ug/K	g) <u>ug/Kg</u>	a	
[108-95-2	Phenol				1000	U	
ı	95 50 1	1.2 Diables	beeree		<u> </u>	1000	1 11	l

		Concentration Office	5.		
CAS No.	Compound	(ug/L or ug/Kg)	_ug/Kg_	a	
108-95-2	Phenol	100	Ю	U	
95-50-1	1,2-Dichlorobenzene	100	0	U	
95-48-7	2-Methylphenol	100	0	U	
106-44-5	4-Methylphenol	100	ю	U	
78-59-1	Isophorone	100	ю	U	
120-82-1	1,2,4-Trichlorobenzene	100	Ю	U	
91-20-3	Naphthalene	100	ю	U	
91-57-6	2-Methylnaphthalene	100	ю	U	
86-73-7	Fluorene	100	Ю	U	
117-81-7	bis(2-Ethylhexyl)phthalate	100	ю	U	
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Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GL-W	S-GB-13
Project No.	: 09928.00.0	1	Site:	GRINRS LAG	Location:	FREMONT, OH	Group:	
Matrix: (so	oil/water)	WATER	-			Lab Sample ID	: WSGB-13	
Sample wt/	/vol:	100.0	(g/mL)	ML		Lab File ID	: LUB091.D	
Level: (lo	ow/med)		_			Date Received	: 12/19/96	
% Moisture	: 100		de	canted: (Y/N):	N	Date Extracted	: 12/19/96	
Concentrate	ed Extract Volur	ne:	1000	_(uL)		Date Analyzed	: 12/20/96	
Injection Vo	olume:	1.0	(uL)			Dilution Factor	: 1.0	
GPC Cleanu	ıp: (Y/N)	N		pH:	7			
					Concentrati	ion Units:		
	AS No.	Compound		(1	ıg/L or ug/Kç	g) <u>ug/L</u>	Q	•
_	08-95-2	Phenol				100	U	
 -	5-50-1	1,2-Dichlord				100	U	
J	5-48-7	2-Methylphe				100	U	
	06-44-5	4-Methylphe	nol			100	U	
	8-59-1	Isophorone				100	U	l
	20-82-1	1,2,4-Trichle		ne		100	U	Į
 -	1-20-3	Naphthalene				100	U	
-	1-57-6	2-Methylnar	hthalene	·		100	U	I
	6-73-7	Fluorene				100	U	!
1	17-81-7	bis(2-Ethylh	exyl)phti	nalate		46	J	I
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SAMPLE NO.

GL-SS-GB-14 0-2'

Lab Name:	ERM-FAST				_	Contract:	LUBRIZOL		
Project No.:	09928.00.0	1	Site	GRINRS L	ΔG	Location:	FREMONT, OH	Group:	GL-SS
Matrix: (soil	water)	SOIL	_				Lab Sample ID:	GB-14 1	•
Sample wt'v	ol:	10.0	(g mL)	<u>G</u>	_		Lab File ID:	LUB129.D	
Level: (lov	v·med)	LOW	-				Date Received:	12/18/96	_
% Moisture:	0		de	ecanted: (Y	N):	N	Date Extracted:	12/20/96	
Concentrated	d Extract Volum	ne:	1000	_(uL)			Date Analyzed:	12/27/96	. ,
Injection Vol	ume:	1.0	_ (uL)				Dilution Factor:	1.0	
GPC Cleanup	o: (Y/N)	N	-		pH:	7			
						Concentrat	ion Units:		
CA	S No.	Compound			(t	ug/L or ug/K	g) <u>ug/Kg</u>	Q	
10	8-95-2	Phenol	_		-		1000	U	

CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	Q
108-95-2	Phenol	1000	U
95-50-1	1,2-Dichlorobenzene	1000	U
95-48-7	2-Methylphenol	1000	U
106-44-5	4-Methylphenol	1000	U
78-59-1	Isophorone	1000	U
120-82-1	1,2,4-Trichlorobenzene	1000	U
91-20-3	Naphthalene	1000	U
91-57-6	2-Methylnaphthalene	1000	U
86-73-7	Fluorene	1000	U
117-81-7	bis(2-Ethylhexyl)phthalate	1000	U
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Lab Name:	EDM_EAST				Contract:	LUBRIZOL	GL-SS-G	B-14 2-4'
	ERM-FAST 09928.00.0		Site: GE	RINRS LAG		FREMONT, OH	Group:	GL 88
-			Site. di	IIIIIO LAG	cocation.		•	GL-33
Matrix: (soil	l/water)	SOIL	•			Lab Sample ID	: <u>GB-14 2</u>	
Sample wt/v	vol:	10.0	(g/mL) <u>G</u>			Lab File ID	: LUB130.D	
Level: (lov	w/med)	LOW				Date Received	12/18/96	
% Moisture:	0		decar	nted: (Y/N):	N	Date Extracted	: 12/20/96	
Concentrate	d Extract Volun	ne:	1000 (uL	_)		Date Analyzed	: 12/27/96	
Injection Vol	lume:	1.0	(uL)			Dilution Factor	:1.0	
GPC Cleanup	p: (Y/N)	N	•	pH:	7			
					Concentrat	ion Units:		
		Compound		(u	ig/L or ug/K	g) <u>ug/Kg</u>	<u>a</u> .	
		Phenol	. <u>. </u>			1000	U	•
	5-50-1	1,2-Dichloro				1000	U	
		2-Methylphe				1000	U	
		4-Methylphe	enoi			1000	U	
 -		1,2,4-Trichle	orohenzene			1000	U	
		Naphthalene				1000	1 0	
		2-Methylnap				1000	 	
		Fluorene				1000	U	
11	17-81-7	bis(2-Ethylhe	exyl)phthala	te		1000	U	
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SAMPLE NO.

GL-SS-GB-14 4-6'

Lab Name:	ERM-FAST			_	Contract:	LUBRIZOL			
Project No.:	09928.00.0)1	Site: GRINRS I	LAG	Location:	FREMONT, OH	Group: GL-SS		
Matrix: (soil:	water)	SOIL	_			Lab Sample ID:	GB-14 3		
Sample wtive	ol:	10.0	(g mL) G	_		Lab File ID:	LUB131.D_		
Level: Ilow	r'med)	Low	_			Date Received:	12/18/96		
% Moisture:	0	-	decanted: (Y	(N): _	N	Date Extracted:	12/20/96		
Concentrated	Extract Volui	me:	1000 (uL)			Date Analyzed:	12/27/96		
Injection Volu	me:	1.0	_(uL)			Dilution Factor:	1.0		
GPC Cleanup:	: (Y/N)	N	_	pH:	7				
			Concentration Units:						
CAS	S No.	Compound		(u	g/L or ug/K	g) <u>ug/Kg</u>	a		

	Concentration Units:			
CAS No.	Compound	(ug/L or ug/Kg) ug/Kg	a	
108-95-2	Phenol	1000	U	
95-50-1	1,2-Dichlorobenzene	1000	U	
95-48-7	2-Methylphenol	1000	U	
106-44-5	4-Methylphenol	1000	U	
78-59-1	Isophorone	1000	U	
120-82-1	1,2,4-Trichlorobenzene	1000	U	
91-20-3	Naphthalene	1000	U	
91-57-6	2-Methylnaphthalene	1000	U_	
86-73-7	Fluorene	1000	Ü	
117-81-7	bisi2-Ethylhexyl)phthalate	1000	U	
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						GL-SS-GB-14 6-8'
Lab Name	e: <u>ERM-FAST</u>			Contract	: LUBRIZOL	L
Project N	o.: <u>09928.00.0</u>	<u>)</u> 1	Site: GRINRS LA	AG Location	: FREMONT, OH	Group: GL-SS
Matrix: (soil/water)	SOIL	_		Lab Sample II	D: <u>GB-14 4</u>
Sample w	/t/vol:	10.0	(g/mL) G	_	Lab File II	D: LUB132.D
Level:	(low/med)	LOW	_		Date Receive	d: <u>12/18/96</u>
% Moistu	ıre: 0	_	decanted: (Y/	(N): N	Date Extracte	d: <u>12/20/96</u>
Concentra	ated Extract Volu	me:	1000 (uL)		Date Analyze	d: <u>12/27/96</u>
Injection \	Volume:	1.0	_(uL)		Dilution Facto	or:1.0
GPC Clea	nup: (Y/N)	N	_	pH:7	_	
		_		Concentr	ation Units:	
	CAS No.	Compound		(ug/L or ug/		Ω
	108-95-2	Phenol			1000	U
	95-50-1	1,2-Dichlord	benzene		1000	U
	95-48-7	2-Methylphe	enol		1000	U
	106-44-5	4-Methylphe	enol		1000	U
	78-59-1	Isophorone			1000	U
	120-82-1	1,2,4-Trichl	orobenzene		1000	U
	91-20-3	Naphthalene			1000	U
	91-57-6	2-Methylnar		- 	1000	-
	86-73-7	Fluorene			1000	-
	117-81-7		exyl)phthalate		1000	U
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SAMPLE NO.

GL-SS-GB-14 10-12'

Lab Name: ERM-FAST Contract: LUBRIZOL Group: GL-SS Project No.: 09928.00.01 Site: GRINRS LAG Location: FREMONT, OH Lab Sample ID: GB-14 5 Matrix: (soil/water) SOIL (g mL) G Lab File ID: LUB133.D Sample wt/vol: 10.0 Date Received: 12/18/96 Level: (low/med) LOW % Moisture: 0 Date Extracted: 12/20/96 decanted: (Y N): N Concentrated Extract Volume: 1000 (uL) Date Analyzed: 12/27/96 Dilution Factor: 1.0 Injection Volume: 1.0 (uL) GPC Cleanup: (Y/N) Ν pH: 7 Concentration Units: Q CAS No. Compound (ug/L or ug/Kg) ug/Kg Ū 108-95-2 Phenol 1000 95-50-1 1,2-Dichlorobenzene 1000 U 95-48-7 2-Methylphenol 1000 Ū 106-44-5 U 4-Methylphenol 1000 Ū 78-59-1 Isophorone 1000 120-82-1 1000 U 1,2,4-Trichlorobenzene Naphthalene 91-20-3 1000 Ū 91-57-6 1000 2-Methylnaphthalene 86-73-7 1000 Ū Fluorene 117-81-7 1000 Ū bis(2-Ethylhexyl)phthalate

						Maria	GL-WS-0	3B-14
Lab Name:	ERM-FAST				Contract:	LUBRIZOL		
Project No.:	09928.00.0	1	Site: G	RINRS LAG	Location:	FREMONT, OH	Group:	
Matrix: (soil	l/water}	WATER	_			Lab Sample ID:	WSGB-14	
Sample wt/v	rol:	100.0	(g/mL) <u>N</u>	1L		Lab File ID:	LUB092.D	•
Level: (lov	w/med)		_			Date Received:	12/19/96	
% Moisture:	100		deca	anted: (Y/N):	N	Date Extracted:	12/19/96	
Concentrate	d Extract Volun	ne:	1000 (ເ	JL)		Date Analyzed:	12/20/96	
Injection Vol	ume:	1.0	(uL)		,	Dilution Factor:	1.0	
GPC Cleanup	o: (Y/N)	N	-	pH:	7			
	•		•	,	Concentrat	ion Units:		
CA	AS No.	Compound		((ug/L or ug/K	g) ug/L	Q	
10	8-95-2	Phenol				100	U	
		1,2-Dichlord	benzene			100	U	
95	-48-7	2-Methylpho	enoi			100	U	
10	6-44-5	4-Methylpho	enol			100	U	
78	3-59-1	Isophorone				100	U	
12	0-82-1	1,2,4-Trichl	orobenzene)		100	U	
91	-20-3	Naphthalene)			100	U	
91	-57-6	2-Methylna	hthalene			100	U	
86	5-73-7	Fluorene				100	U	
11	7-81-7	bis(2-Ethylh	exyl)phthal	ate		100	U	
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		51	MIVULATILE ORGAN	ICS ANALYSI	S DATA SHEET	GL-55-0	SB-15 0-2
Lab Name	ERM-FAST			Contract:	LUBRIZOL		
Project No	.: 09928.00.0)1	Site: GRINRS LAG	3 Location:	FREMONT, OH	Group:	GL-SS
Matrix: (s	oil/water)	SOIL	_		Lab Sample ID:	GB-15 1	-
Sample wi	t ∕vol :	10.0	(g mL) G		Lab File ID:	LUB142.D	
Level: (i	low/med)	LOW	_		Date Received:	12/18/96	•
% Moistur	e: <u> </u>	-	decanted: (Y N): <u>N</u>	Date Extracted:	12/20/96	- ,
Concentra	ted Extract Volu	me:	1000 (uL)		Date Analyzed:	12/27/96	-
Injection V	olume:	1.0	(uL)		Dilution Factor:	1.0	_
GPC Clean	up: (Y/N)	N	_ pł	1: <u>7</u>			
				Concentrat	tion Units:		
(CAS No.	Compound		(ug/L or ug/K	g) <u>ug/Kg</u>	Q	_
ſ	108-95-2	Phenol			1000	U]
	95-50-1	1,2-Dichlord	benzene	1	1000	U]
	95-48-7	2-Methylph	enol		1000	U]
	106-44-5	4-Methylph	enol		1000	U]
	78-59-1	Isophorone			1000	U]
	120-82-1	1,2,4-Trich	orobenzene		1000	U]
	91-20-3	Naphthalene			1000	U]
[9	91-57-6	2-Methylna	phthalene		1000	U	
	86-73-7	Fluorene			1000	U	<u> </u>
	117-81-7	bis(2-Ethylh	exyl)phthalate		1000	U	1
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						GL-SS-GB-15 2-4'	
Lab Name	e: <u>ERM-FAST</u>			Contract:	LUBRIZOL		
Project No	o.: <u>09928.00.0</u>	21	Site: GRINRS LAG	Location:	FREMONT, OH	Group: GL-SS	
Matrix: (soil/water)	SOIL			Lab Sample ID:	GB-15 2	
Sample w	rt/vol:	10.0	(g/mL) G		Lab File ID:	LUB143.D	
Level:	(low/med)	LOW			Date Received:	12/18/96	
% Moistu	re: 0		decanted: (Y/N):	N	Date Extracted:	12/20/96	
Concentra	ated Extract Volum	me:	_1000_(uL)		Date Analyzed:	12/27/96	
Injection \	Volume:	1.0	(uL)		Dilution Factor:	1.0	
GPC Clear	nup: (Y/N)	N	pH:	77			
				Concentrat	ion Units:		
	CAS No.	Compound	(0	ug/L or ug/K	g) <u>ug/Kg</u>	Q	
	108-95-2	Phenol			1000	U	
	95-50-1	1,2-Dichloro	benzene		1000	U	
	95-48-7	2-Methylphe			1000	U	
	106-44-5	4-Methylphe	enol		1000	U	
	78-59-1	Isophorone			1000	U	
	120-82-1	1,2,4-Trichle			1000	U ,	
	91-20-3	Naphthalene			1000	U	
	91-57-6	2-Methylnap	nthalene		1000	U	
	86-73-7	Fluorene	and the balance		1000	U	
	117-81-7	DIS(2-Ethylno	exyl)phthalate		1000	U	
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Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GL-SS-GB-15 4-6
Project No.:	09928.00.0	1	Site:	GRINRS LAG	Location:	FREMONT, OH	Group: GL-SS
Matnx: (soil/	water)	SOIL				Lab Sample ID:	GB-15 3
Sample wtive	ol:	10.0	(g·mL)	G		Lab File ID:	LUB144.D
Level: flow	r/med)	LOW				Date Received:	12/18/96
% Moisture:	0		- d∈	canted: (Y N):	N	Date Extracted:	12/20/96
Concentrated	Extract Volum	ne:	1000	(uL)		Date Analyzed:	12/27/96
Injection Volu	ıme:	1.0	(uL)	-		Dilution Factor:	1.0
GPC Cleanup	: (Y/N)	N	-	pH:	7		
	•		•		Concentrat	tion Units:	
CA	S No.	Compound		(ug/L or ug/K	g) <u>ug/Kg</u>	<u> </u>
10	8-95-2	Phenol				1000	U
95-	-50-1	1,2-Dichlord	benzene			1000	U ,
	-48-7	2-Methylphe		 =	<u> </u>	1000	U
		4-Methylphe	enol		ļ	1000	U
		Isophorone				1000	U
	0-82-1	1,2,4-Trich		ene	ļ	1000	U
		Naphthalene		_	 	1000	U
	-57-6 -73-7	2-Methylna	mmalen	<u></u>	 	1000	U.
		Fluorene bis(2-Ethylh	avad\nbti	halate	 -	1000	U
 	7-61-7	UIS(2-Ethyln	exyi)phu	nasate		1000	
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Lab Name: ERM-FAS	ST		Contract:	LUBRIZOL	GL-SS-GB-15 6-8	;•
Project No.: 09928.0		Site: GRINRS LAG		FREMONT, OH	Group: GL-SS	
Matrix: (soil/water)	SOIL			Lab Sample ID:	GB-15 4	
Sample wt/vol:	10.0	(g/mL) G		Lab File ID:	LUB145.D	
Level: (low/med)	LOW			Date Received:	12/18/96	
% Moisture: 0		decanted: (Y/N)	: N	Date Extracted:	12/20/96	
Concentrated Extract V	olume:	1000 (uL)		Date Analyzed:	12/27/96	
Injection Volume:	1.0	(uL)		Dilution Factor:	1.0	
GPC Cleanup: (Y/N)	N	pHq	:7			
CAS No.	Compound		Concentrat (ug/L or ug/K		Q	
108-95-2	Phenol		1	2300		
95-50-1	1,2-Dichloro	benzene	 	1000	Ü	
95-48-7	2-Methylphe		1	1000	U	
106-44-5	4-Methylphe	enol		1000	U	
78-59-1	Isophorone			1000	U	
120-82-1	1,2,4-Trichle	orobenzene		1000	U	
91-20-3	Naphthalene			1000_	Ų	
91-57-6	2-Methylnap	hthalene		1000	U	
86-73-7	Fluorene			1000	ν ,	
117-81-7	bis(2-Ethylhe	exyl)phthalate		1000	U	
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SAMPLE NO.

GL-SS-GB-15 8-10'

Lab Name:	ERM-FAST			Contract:	LUBRIZOL	
Project No.:	09928.00.0	21	Site: GRINRS LAG	Location:	FREMONT, OH	Group: GL-SS
Matrix: (soil	(water)	SOIL			Lab Sample ID:	GB-15 5
Sample wt/v	ol:	10.0	(g mL) G		Lab File ID:	LUB146.D
Level: (lov	w/med)	LOW	_		Date Received:	12/18/96_
% Moisture:	0	_	decanted: (Y N):	N	Date Extracted:	12/20/96
Concentrate	d Extract Volu	me:	1000 (uL)		Date Analyzed:	12/27/96
Injection Vol	ume:	1.0	(uL)		Dilution Factor:	1.0
GPC Cleanus	o: (Y/N)	N	pH:	7		
				Concentrati	on Units:	•
CA	No.	Compound	(1	ug/L or ug/Kg) ug/Kg	Q
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		Concentration ones.	
CAS No.	Compound	(ug/Lorug/Kg) ug/I	<u>(g</u> O
108-95-2	Phenol	6700	
95-50-1	1,2-Dichlorobenzene	1000	U
95-48-7	2-Methylphenol	1000	U
106-44-5	4-Methylphenol	1000	U
78-59-1	Isophorone	1000	U
120-82-1	1,2,4-Trichlorobenzene	1000	U
91-20-3	Naphthalene	1000	U
91-57-6	2-Methylnaphthalene	1000	U
86-73-7	Fluorene	1000	U
117-81-7	bis(2-Ethylhexyl)phthalate	1000	U
			
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							GL-WS	S-GB-15
Lab Name:	ERM-FAST				Contract:	LUBRIZOL		
Project No.:	09928.00.0	1	Site:	GRINRS LAG	Location:	FREMONT, OH	Group:	GL-WS
Matrix: (soi	l/water)	WATER	_			Lab Sample ID:	GB-15	
Sample wt/v	vol:	100.0	(g/mL)	ML		Lab File ID:	LUB097.D	
Level: (to	w/med)					Date Received:	12/18/96	
% Moisture:	100		de	ecanted: (Y/N):	N	Date Extracted:	12/20/96	
Concentrate	d Extract Volun	ne:	1000	(uL)		Date Analyzed:	12/26/96	
Injection Vol	lume:	1.0	(uL)	-		Dilution Factor:	1.0	
GPC Cleanu	•	N	• `	:Ha	7			
,			-	·	Concentrat	tion Units:		
C	AS No.	Compound		(1	ug/L or ug/K		Q	
110		Phenol		·		100	U	
	5-50-1	1,2-Dichloro	benzene	· · · · · · · · · · · · · · · · · · ·		100	U	
	5-48-7	2-Methylphe				100	U	
		4-Methylpho				100	U	
		Isophorone	· · · · · · · · · · · · · · · · · · ·			100	U	
	20-82-1	1,2,4-Trichl	orobenze	ene		100	U	
9	1-20-3	Naphthalene)			100	U	
	1-57-6	2-Methylnar		e		100	U	
86	6-73-7	Fluorene		·		100	U	,
11	17-81-7	bis(2-Ethylh	exyl)phtl	halate		100	U	,
								
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SAMPLE NO.

6 0-2'

Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GL-SS-GB-16
Project No	.: 09928.00.0	21	Site	GRINRS LAG	Location:	FREMONT, OH	Group: GL-SS
Matrix: (s	od/water)	SOIL				Lab Sample ID:	GB-16 1
Sample wi	#vol:	10.0	[g·mL)	G		Lab File ID:	LUB134.D
Level: (I	ow 'med)	LOW	_			Date Received:	12/18/96
% Moistur	e: <u> </u>	_	de	ecanted: (Y/N):	N	Date Extracted:	12/20/96
Concentrat	ted Extract Volu	me:	1000	_(uL)		Date Analyzed:	12/27/96
Injection V	olume:	1.0	(uL)			Dilution Factor:	1.0
GPC Clean	up: (Y/N)	N	_	pH:	7		
				_	Concentration		
_	CAS No.	Compound			ug/L or ug/Kg		<u> </u>
[108-95-2	Phenol				1000	U
[9	95-50-1	1,2-Dichloro	benzene			1000	U
	95-48-7	2-Methylphi	enol			1000	Ü
	106-44-5	4-Methylphi	enol			1000	U
[78-59-1	Isophorone]	1000	U
Ţ.	120-82-1	1,2,4-Trich	orobenz	ene		1000	U ,
[9	91-20-3	Naphthalene	•			1000	U
[9	91-57-6	2-Methylna	phthalen	e		1000	U
1	36-73-7	Fluorene				1000	U
ļ-	117-81-7	bis(2-Ethylh	exyl)pht	halate		1000	Ū
							
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						GL-SS-G	B-16 2-4'
Lab Name:	ERM-FAST		<u>.</u>	Contract:	LUBRIZOL		
Project No.:	09928.00.0	1	Site: GRINRS LAG	Location:	FREMONT, OH	Group:	GL-SS
Matrix: (soil/v	water)	SOIL			Lab Sample ID:	GB-16 2	
Sample wt/vo	l:	10.0	(g/mL) G		Lab File ID:	LUB135.D	
Level: (low/	/med)	LOW			Date Received:	12/18/96	
% Moisture:	0		decanted: (Y/N):	N	Date Extracted:	12/20/96	
Concentrated	Extract Volun	ne:	1000 (uL)		Date Analyzed:	12/27/96	
Injection Volum	me:	1.0	(uL)		Dilution Factor:	1.0	
GPC Cleanup:	(Y/N)	N	pH:	7			
	•		•	Concentrat	ion Units:		
CAS	S No.	Compound	(ug/L or ug/Kg	g) <u>ug/Kg</u>	Q	
108	-95-2	Phenol			1000	U	
95-8	50-1	1,2-Dichloro	benzene		1000	U	•
95-4	48-7	2-Methylphe	enol		1000	U	
		4-Methylphe			1000	U	
		Isophorone	······································		1000	U	
)-82-1	1,2,4-Trichle	probenzene		1000	Ū	
) ,		Naphthalene			1000	U	
91-5		2-Methylnap			1000	Ü	
		Fluorene	THE TOTAL CONTROL OF THE TOTAL CONTROL OT THE TOTAL CONTROL OF THE TOTAL		1000	Ü	
			exyl)phthalate		1000	Ü	
1117	-01-7	DIS(Z-LUTYITI	exyl/pritridiate		1000		
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SAMPLE NO.

GL-SS-GB-16 4-6'

Lab Name:	ERM-FAST			Contract:	LUBRIZOL	
Project No.:	09928.00.01		Site: GRINRS LAG	Location:	FREMONT, OH	Group: GL-SS
Matnx: (soil:	water)	SOIL	_		Lab Sample ID:	GB-16 3
Sample wt vo	xl:	10.0	(g·mL) G		Lab File ID:	LUB136.D
Level: (low	/med)	LOW	_		Date Received:	12/18/96
% Moisture:	0		decanted: (Y N):	N	Date Extracted:	12/20/96
Concentrated	Extract Volume	e :	1000 (uL)		Date Analyzed:	12/27/96
njection Volu	me:	1.0	_(uL)		Dilution Factor:	1.0
GPC Cleanup:	: (Y/N)	N	pH:	7		
	_		_	Concentrat	tion Units:	

	Concentration Units:							
Compound	(ug/L or ug/Kg)	ug/Kg_	Q					
Phenol	100	00	U					
1,2-Dichlorobenzene	100	00	U					
2-Methylphenol	100	00	U					
4-Methylphenol	100	00	U					
Isophorone	100	00	U					
1,2,4-Trichlorobenzene	100	00	U					
Naphthalene	100	00	U					
2-Methylnaphthalene	100	00	U					
Fluorene	100	00	Ü					
bis(2-Ethylhexyl)phthalate	100	00	U					
			_					
	- 	<u> </u>	·····					
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	Phenol 1,2-Dichlorobenzene 2-Methylphenol 4-Methylphenol Isophorone 1,2,4-Trichlorobenzene Naphthalene 2-Methylnaphthalene Fluorene	Compound (ug/L or ug/Kg) Phenol 100 1,2-Dichlorobenzene 100 2-Methylphenol 100 4-Methylphenol 100 Isophorone 100 1,2,4-Trichlorobenzene 100 Naphthalene 100 2-Methylnaphthalene 100 Fluorene 100	Compound (ug/L or ug/Kg) ug/Kg Phenol 1000 1,2-Dichlorobenzene 1000 2-Methylphenol 1000 4-Methylphenol 1000 Isophorone 1000 1,2,4-Trichlorobenzene 1000 Naphthalene 1000 2-Methylnaphthalene 1000 Fluorene 1000					

lah Massa	. FDM FACT			Cantrooti	LUBRIZOL	GL-SS-GB-16 6-8'	
Lab Name				Contract:			-
Project No	o.: <u>09928.00.0</u>	21 \$	Site: GRINRS LAG	Location:	FREMONT, OH	Group: GL-SS	_
Matrix: (s	soil/water)	SOIL			Lab Sample ID:	GB-16 4	
Sample w	t/vol:	10.0(g/m	nL) G		Lab File ID:	LUB137.D	
Level: (low/med)	LOW			Date Received:	12/18/96	
% Moistu	re: 0	_	decanted: (Y/N):	N .	Date Extracted:	12/20/96	
Concentra	ited Extract Volu	me: <u>10</u>	00 (uL)		Date Analyzed:	12/27/96	
Injection V	/olume:	1.0 (uL)			Dilution Factor:	1.0	
GPC Clear	nup: (Y/N)	<u> </u>	pH:	7		•	
				Concentrat	ion Units:		
_	CAS No.	Compound	((ug/L or ug/K	g) <u>ug/Kg</u>	Q	
[108-95-2	Phenol			1000	U	
Į	95-50-1	1,2-Dichlorobenz	ene		1000	U	
	95-48-7_	2-Methylphenol			1000	U	
<u> </u>	106-44-5	4-Methylphenol			1000	υ	
	78-59-1	Isophorone			1000	U	
	120-82-1	1,2,4-Trichlorob	enzene		1000	U	
le le	91-20-3	Naphthalene			1000	U	
	91-57-6	2-Methylnaphtha	ilene		1000	U	
-	86-73-7	Fluorene			1000	U	
<u> </u>	117-81-7	bis(2-Ethylhexyl)	phthalate		1000	U	
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Lab Name:	ERM-FAST				Contract:	LUBRIZOL	GL-SS-GB-16 8-10
Project No.:)1	Site	GRINRS LAG	_	FREMONT, OH	Group: GL-SS
Matnx: (soil/		SOIL	0.10	<u> </u>	2000	Lab Sample ID:	-
Sample wt/vo	ol:	10.0	(g·mL)	G		Lab File ID:	LUB150.D
Level: (low	r/med)	LOW				Date Received:	12/18/96
% Moisture:	0	-	de	canted: (Y/N):	N	Date Extracted:	12/31/96
Concentrated	Extract Volu	me:	1000	(uL)		Date Analyzed:	12/31/96
Injection Volu	me:	1.0	(uL)			Dilution Factor:	1.0
GPC Cleanup:	: (Y/N)	N		pH:			
					Concentrat	ion Units:	
CAS	S No.	Compound		(ug/L or <mark>ug/K</mark>	g) <u>ug/Kg</u>	Q
108	3-95-2	Phenol				1000	U
95-	50-1	1,2-Dichlord	benzene			1000	U
95~	48-7	2-Methylph	enol			1000	U
106	5-44-5	4-Methylphe	enol			1000	U
78-	59-1	Isophorone				1000	U
120	D-82-1	1,2,4-Trichl	orobenze	ene		1000	U
91-	20-3	Naphthalene	<u>. </u>			1000	U
91-	57-6	2-Methylnag	hthalen	B		1000_	U
86-	73-7	Fluorene				1000	υ
117	7-81-7	bis(2-Ethylh	exyl)phti	nalate		1000	U
<u> </u>							

Lab Name	e: ERM-FAST			Contract:	LUBRIZOL	GL-SS-GB-1	7 0-2'
Project No	o.: <u>09928.00.0</u>	1	Site: GRINRS LAG	Location:	FREMONT, OH	Group: GL-	ss
Matrix: (soil/water)	SOIL			Lab Sample ID:	GB-17 1	
Sample w	rt/vol:	10.0	(g/mL) G		Lab File ID:	LUB138.D	
Level:	(low/med)	LOW	•		Date Received:	12/18/96	
% Moistu	ıre: <u> </u>		decanted: (Y/N):	N	Date Extracted:	12/20/96	
Concentra	ated Extract Volur	ne:	1000 (uL)		Date Analyzed:	12/27/96	•
Injection \	Volume:	1.0	(uL)		Dilution Factor:	1.0	
GPC Clea	nup: (Y/N)	N	pH:	7			
				Concentrat	ion Units:		
	CAS No.	Compound	((ւց/L or ug/Kզ	g) ug/Kg	Ω	
	108-95-2	Phenol			1000	U	
	95-50-1	1,2-Dichloro	benzene		1000	U	
	95-48-7	2-Methylphe	enol		1000	U	
	106-44-5	4-Methylphe	enol		1000	U	
	78-59-1	Isophorone			1000	U	
	120-82-1	1,2,4-Trichl	orobenzene		1000	U	
	91-20-3	Naphthalene			1000	U	
	91-57-6	2-Methylnap	ohthalene		1000	U	
	86-73-7	Fluorene			1000	U	
	117-81-7	bis(2-Ethylh	exyl)phthalate		1000	U	
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SAMPLE NO.

Date Analyzed: 12/27/96

1.0

Dilution Factor:

GL-SS-GB-17 2-4' LUBRIZOL **ERM-FAST** Contract: Lab Name: Project No.: 09928.00.01 Site: GRINRS LAG Location: FREMONT, OH Group: GL-SS Lab Sample ID: GB-17 2 Matnx: (soil/water) SOIL (g mL) G Sample wt:vol: 10.0 Lab File ID: LUB139.D Date Received: 12/18/96 Level: (low/med) LOW decanted: (Y N): N Date Extracted: 12/20/96

Injection Volume: 1.0 (uL)

1000 (uL)

GPC Cleanup: (Y 'N) Ν

% Moisture:

Concentrated Extract Volume:

	Concentration Units:	
Compound	(ug/L or ug/Kg) ug/Kg	a
Phenol	1000	U
1,2-Dichlorobenzene	1000	U
2-Methylphenol	1000	U
4-Methylphenol	1000	U
Isophorone	1000	U
1,2,4-Trichlorobenzene	1000	U
Naphthalene	1000	U
2-Methylnaphthalene	1000	U
Fluorene	1000	U
bis(2-Ethylhexyl)phthalate	1000	U
		
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	Phenol 1,2-Dichlorobenzene 2-Methylphenol 4-Methylphenol Isophorone 1,2,4-Trichlorobenzene Naphthalene 2-Methylnaphthalene Fluorene	Compound (ug/L or ug/Kg) ug/Kg Phenol 1000 1,2-Dichlorobenzene 1000 2-Methylphenol 1000 4-Methylphenol 1000 Isophorone 1000 1,2,4-Trichlorobenzene 1000 Naphthalene 1000 2-Methylnaphthalene 1000 Fluorene 1000

							GL-SS-GB-1	7 4-6'
	ERM-FAST				Contract:	LUBRIZOL	L	
Project No.:	09928.00.0	.1	Site:	GRINRS LAG	Location:	FREMONT, OH	Group: GL-	·ss
Matrix: (soil/v	water)	SOIL				Lab Sample ID:	GB-17 3	
Sample wt/vol	1:	10.0	(g/mL)	G		Lab File ID:	LUB140.D_	
Level: (low)	/med)	LOW				Date Received:	12/18/96	•
% Moisture:	0		de	ecanted: (Y/N):	N	Date Extracted:	12/20/96_	
Concentrated	Extract Volun	ne:	1000	_(uL)		Date Analyzed:	12/27/96	
Injection Volum	me:	1.0	(uL)			Dilution Factor:	1.0	
GPC Cleanup:	(Y/N)	N		pH:	7			
					Concentrat	ion Units:		
	No.	Compound		((ug/L or ug/K		<u>a</u>	
	-95-2	Phenol				1000	U	
95-8		1,2-Dichloro	benzene	·		1000	U	
95-4	48-7	2-Methylphe	nol			1000	U	
	-44-5	4-Methylphe	nol			1000	U	
78-5	59-1	Isophorone				1000	U	
120	-82-1	1,2,4-Trichle	orobenze	ene		1000	U	
91-2	20-3	Naphthalene				1000	U	
91-5	57-6	2-Methylnap	hthalen	e		1000	U	
	73-7	Fluorene				1000	U	
117	-81-7	bis(2-Ethylhe	exyl)phtl	nalate		1000	U	
 							 	
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SAMPLE NO.

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							GL-SS-	GB-17 6-
Lab Name:	ERM-FAST				Contract:	LUBRIZOL		
Project No.:	09928.00.0	1	Site	GRINRS LA	6 Location:	FREMONT, OH	Group:	GL-SS
Matrix: (sodi	water)	SOIL	•			Lab Sample ID:	GB-17 4	_
Sample wt/vo	:k	10.0	(g·mL)	G		Lab File ID:	LUB141.D	_
Level: (low	/med)	LOW				Date Received:	12/18/96	_
% Moisture:	0		de	ecanted: (Y-N): <u> </u>	Date Extracted:	12/20/96	_
Concentrated	Extract Volum	ne:	1000	(uL)		Date Analyzed:	12/27/96	_
Injection Volu	me:	1.0	(uL)			Dilution Factor:	1.0	_
GPC Cleanup:	(Y/N)	N		ρH	l:7			
		 .	-		Concentrat	tion Units:		
CAS	S No.	Compound			(ug/L or ug/K	g) ug/Kg	Q	
108	3-95-2	Phenol			1	1000	U]
95-	50-1	1,2-Dichlord	benzene			1000	U]
95-	48-7	2-Methylphe	enol			1000	U]
106	5-44-5	4-Methylphe	enol			1000	U]
78-	59-1	Isophorone				1000	U	
120	0-82-1	1,2,4-Trich	orobenze	ene		1000	U]
91-	20-3	Naphthalene				1000	U	
91-	57-6	2-Methylnag	hthalen	e		1000	U	
86-	73-7	Fluorene				1000	U	」、
117	7-81-7	bis(2-Ethylih	exyl)phti	halate		1000	U	-
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Appendix I Stream Surface Water/Soil Analytical Results and Sediment Grain Size Analysis Results

Analytical Results

ANALYTICAL QUALITY ASSURANCE REPORT

Lubrizol Corporation
Greiner's Lagoon Site
Sandusky County, Ohio
Surface Water and Sediment
Samples Collected 31 July 1997
In Association with the
Engineering Evaluation/Cost Analysis

30 September 1997

(EE/CA) Site Investigation

Environmental Resources Management

855 Springdale Drive Exton, Pennsylvania 19341

File No.: 09928.00.01

ANALYTICAL QUALITY ASSURANCE REPORT

Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

Surface Water and Sediment
Samples Collected 31 July 1997
In Association with the
Engineering Evaluation/Cost Analysis
(EE/CA) Site Investigation

30 September 1997

Scott J. Brecker

Quality Assurance Chemist

Purshotam L. Batra Technical Reviewer

Environmental Resources Management

855 Springdale Drive Exton, Pennsylvania 19341 File No: 09928.00.01

TABLE OF CONTENTS

1.0	INT	RODUCT	TION .	1
2.0	ORG	GANIC D	ATA	3
	2.1 (GENERAI	L ORGANIC DATA QUALIFIERS	3
	2.2	ORGA	NIC DATA QUALIFIERS	4
		2.2.1	Sediment Organic Data Qualifiers	4
		2.2.2	Surface Water Organic Data Qualifiers	4
3.0	INO	RGANIC	DATA	6
	3.1	INOR	GANIC DATA QUALIFIERS	7
		3.1.1	Sediment Inorganic Data Qualifiers	7
		3.1.2	Surface Water Inorganic Data Qualifiers	8
4.0	SUN	<i>IMARY</i>		10

ATTACHMENTS

- 1 METHODOLOGY SUMMARY/METHOD REFERENCES
- 2 DATA SUMMARY TABLES

LIST OF TABLES

1-1 Summary of Data Reviewed

2

1.0 INTRODUCTION

This analytical quality assurance report is based upon a review of analytical data generated for surface water and sediment samples and associated quality control samples collected on 31 July 1997 at the Lubrizol Corporation, Greiner's Lagoon Site located in Sandusky County, Ohio as part of the Engineering Evaluation/Cost Analysis (EE/CA) Site Investigation. The analytical methods which were used in these analyses are summarized and referenced in Attachment 1. The sample locations, matrix, dates of collection, and analyses performed are provided in Table 1-1. Data summary tables presenting the validated and/or qualified analytical results are provided in Attachment 2.

The analytical data were reviewed for adherence to the specified analytical protocols. The reported results for organic and inorganic analyses have been validated or qualified using general guidance provided by the "National Functional Guidelines for Organic (and Inorganic) Data Review", USEPA, 2/94 (and 2/94).

Table 1-1 Summary of Sampling Data Reviewed
The Lubrizol Corporation
Greiner's Lagoon Site
Sandusky County, Ohio

Sample Location	Matrix	Date Sampled	Analyses Performed
GL-WS-SW-1	Aqueous	7/31/97	[1], [2], [3], [4], [5]
GL-WS-SW-1DUP (Field Duplicate of GL-WS-SW-1)	Aqueous	7/31/97	[1], [2], [3], [4], [5]
GL-WS-SW-2	Aqueous	7/31/97	[1], [2], [3], [4], [5]
GL-WS-SW-3	Aqueous	7/31/97	[1], [2], [3], [4], [5]
GL-WS-SW-4	Aqueous	7/31/97	[1], [2], [3], [4], [5]
GL-SS-SED-1	Sediment	7/31/97	[1], [2], [3], [5]
GL-SS-SED-1DUP (Field Duplicate of GL-SS-SED-1)	Sediment	7/31/97	[1], [2], [3], [5]
GL-SS-SED-2	Sediment	7/31/97	[1], [2], [3], [5]
GL-SS-SED-3	Sediment	7/31/97	[1], [2], [3], [5]
GL-SS-SED-4	Sediment	7/31/97	[1], [2], [3], [5]
GL-WS-ER*	DI Water	7/31/97	[1], [2], [3], [5]
TRIP BLANK	DI Water	7/31/97	[1]

Analyses Performed Codes:

- [1] = Selected Target Compound List (TCL) Volatile Organic Compounds.
- [2] = Selected TCL Semivolatile Organic Compounds.
- [3] = Selected Target Analyte List (TAL) Metals.
- [4] = Alkalinity, Chemical Oxygen Demand (COD), Total Hardness.
- [5] = Total Organic Carbon (TOC).

Note: Analysis for alkalinity, COD, total hardness and TOC were evaluated for blank contamination and analysis holding times only. All other sample results received a comprehensive QA review.

^{*} This sample is an equipment rinsate.

2. 0 ORGANIC DATA

The organic analyses of the surface water and sediment samples and associated field quality control samples were performed by Quanterra Environmental Services of North Canton, Ohio. The samples were analyzed for selected volatile and semivolatile organic compounds, as indicated in Table 1-1. All sample analyses were performed according to the protocols specified in "Test Methods for Evaluating Solid Waste", SW-846, 3rd Edition (November 1986 and it's updates). The methods used for these analyses are summarized and referenced in Attachment 1.

The findings offered in this report are based on a review of data generated according to a CLP-equivalent data deliverable format for all samples. The following deliverables were evaluated for conformance with the criteria: chain of custody documentation, holding times, laboratory method, travel, and field blank analysis results, surrogate compound recoveries, matrix spike compound recoveries and reproducibility, bromofluorobenzene (BFB) and decafluorotriphenylphosphine (DFTPP) mass tuning results, initial and continuing calibration summaries, internal standard performance summaries, qualitative mass spectral interpretation and quantitation of results.

The organic analyses were performed acceptably, but require qualifying statements. It is recommended that the reported analytical results be used only with the qualifying statements provided in this report. Any aspects of the data which are not discussed in this report should be considered qualitatively and quantitatively valid as reported, based on the deliverables reviewed. Data summary tables presenting the validated and qualified results are provided in Attachment 2.

2.1 GENERAL ORGANIC DATA QUALIFIERS

- Compounds that were qualitatively identified at concentrations below their respective Quantitation Limits have been marked with a "J" qualifier (as required by USEPA protocol) to indicate that they are quantitative estimates.
- ERM-established criteria were used to evaluate blind field duplicate
 analysis precision results. Precision was evaluated in terms of relative
 percent difference (RPD) between detected results in the duplicate
 samples. The RPD was not calculated for the compounds that were
 detected in one sample but were not detected in the other sample.

2.2 ORGANIC DATA QUALIFIERS

2.2.1 Sediment Organic Data Qualifiers

- The positive result reported for acetone in the sediment sample GL-SS-SED-4 should be considered a quantitative estimate. Poor relative response factor (RRF) precision (>25% difference) was observed for this compound with the initial calibration average RRF and the continuing calibration RRF associated with this sample. Poor continuing calibration RRF precision indicates a lack of instrument stability for acetone in associated samples, and the reported positive result for this compound should be considered a quantitative estimate. This has been indicated by placing a "J" qualifier next to the positive result reported for acetone in this sample.
- Sample GL-SS-SED-1 and it's field duplicate, GL-SS-SED-1Dup, were submitted to the laboratory to evaluate sampling and analytical precision for those compounds determined to be confidently detected. There were no target compounds positively identified in theses samples above the quantitation limits, so the field duplicate precision could not be evaluated in terms of the RPD of positively identified target compounds.

2.2.2 Surface Water Organic Data Qualifiers

- The surface water sample GL-WS-SW-3 was analyzed for volatile organic compounds at initial dilutions because of suspected high levels of matrix interferences in the sample. The initial dilution was required to reduce the levels of interference for the sample analysis. However, higher quantitation limits have resulted for specific volatile organic compounds which were not detected with this sample analysis. This should be noted when assessing this sample for the qualitative absence of volatile organic compounds.
- The quantitation limits for acid-extractable semivolatile organic compounds in surface water sample GL-WS-SW-3 should be considered biased low quantitative estimates and may be higher than reported. A low recovery (<10%) was obtained for the acid-extractable surrogate compound 2-fluorophenol with the analysis of this sample. The low recovery may be the result of extraction inefficiencies and/or matrix interferences present in the sample, and the quantitation limits for acid-extractable semivolatile organic compounds should be considered biased low quantitative estimates. This has been indicated by placing "J" qualifiers next to the quantitation limits for acid-extractable semivolatile organic compounds in sample GL-WS-SW-3. The possibility of elevated

- quantitation limits should be noted when assessing this sample for the qualitative absence of acid-extractable semivolatile organic compounds.
- Sample GL-WS-SW-1 and it's field duplicate, GL-WS-SW-1Dup, were submitted to the laboratory to evaluate sampling and analytical precision for those compounds determined to be confidently detected. There were no target compounds positively identified in theses samples above the quantitation limits, so the field duplicate precision could not be evaluated in terms of the RPD of positively identified target compounds.

The inorganic analyses of the surface water and sediment samples and associated field quality control samples were performed by Quanterra Environmental Services of North Canton, Ohio. These samples were analyzed for selected Target Analyte List metals, alkalinity, chemical oxygen demand (COD), total hardness, and total organic carbon (TOC), as indicated in Table 1-1. The metals analyses were performed according to the protocols specified in "Test Methods for Evaluating Solid Waste", SW-846, 3rd Edition (November 1986 and it's updates). Analyses for the wet chemistry parameters were performed according to procedures provided in the "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020 (March 1983) and "Standard Methods of Chemical Analysis", 6th Edition (1963). The methods used for these analyses are summarized and referenced in Attachment 1.

The findings for the inorganic analyses are based on a review of the data generated according to a CLP-equivalent data deliverable format. The following deliverables for metals were evaluated for conformance with criteria: chain of custody documentation, holding times, laboratory method blank results, matrix spike recoveries, detection limits/sensitivity, initial and continuing calibrations, laboratory control sample results, Inductively Coupled Plasma (ICP) Emission Spectroscopy interference check sample results, ICP serial dilution results, and Graphite Furnace Atomic Absorption (GFAA) Spectroscopy post-digestion spike recoveries. The findings for the wet chemistry parameters (alkalinity, COD, total hardness, and TOC) are based upon an evaluation for blank contamination and analysis holding times only.

The inorganic analyses were performed acceptably, but require qualifying statements. It is recommended that the analytical results be used only with the qualifying statements provided in this report. Any aspects of the data which are not discussed in this report should be considered qualitatively and quantitatively valid as reported, based on the deliverables reviewed. Data summary tables presenting the validated and qualified results are provided in Attachment 2.

3.1 INORGANIC DATA QUALIFIERS

3.1.1 Sediment Inorganic Data Qualifiers

- The positive result reported for total organic carbon (TOC) in sediment sample GL-SS-SED-1 is qualitatively invalid due to the level at which this parameter was detected in associated laboratory method and/or field blanks. USEPA protocol requires positive sample results that are less than five times the level detected in associated laboratory method and/or field blanks to be considered qualitatively. This has been indicated by placing a "B" qualifier next to the positive result for TOC in sediment sample GL-SS-SED-1 on the data summary table.
- The positive results and/or detection limits reported for antimony, arsenic and selenium in all sediment samples should be considered biased low quantitative estimates and may be higher than reported. The associated matrix spike recoveries were below the established quality control (QC) limit for these analytes. The low recoveries indicate the presence of matrix interferences in samples of a similar matrix. This has been indicated by placing "J" qualifiers next to the positive results and/or detection limits for these analytes on the data summary table. The possibility of elevated detection limits should be noted when assessing the data for the qualitative absence of antimony, arsenic and selenium in these samples.
- The positive results reported for lead in all sediment samples should be considered biased high quantitative estimates and may be lower than reported. The associated continuing calibration recovery was above the established quality control (QC) limit for this analyte. The high recovery indicates a possible high instrument bias with the measurement of lead, and the associated sample results should be considered biased high quantitative estimates. This has been indicated by placing a "J" qualifier next to the positive results for this analyte on the data summary table.
- The positive results reported for copper in all sediment samples should be considered biased low quantitative estimates and may be higher than reported. The associated continuing calibration recovery was below the established quality control (QC) limit for this analyte. The low recoveries indicates a possible low instrument bias with the measurement of copper, and the associated sample results should be considered biased low quantitative estimates. This has been indicated by placing a "J" qualifier next to the positive results for this analyte on the data summary table.

 Sediment sample GL-SS-SED-1 and it's field duplicate sample, GL-SS-SED-1Dup, were submitted to the laboratory to evaluate sampling and analytical field precision for those inorganic parameters determined to be confidently detected. Field duplicate analysis precision was determined by comparison of the analytical results for these duplicate samples and calculation of the relative percent difference (RPD) between the positive analytical results detected for the specific parameters.

ERM's blind field duplicate precision criteria of 35% for inorganic parameters was met for all positive results.

3.1.2 Surface Water Inorganic Data Qualifiers

- The positive results reported for total organic carbon (TOC) in all surface water samples are qualitatively invalid due to the level at which this parameter was detected in associated laboratory method and/or field blanks. USEPA protocol requires positive sample results that are less than five times the level detected in associated laboratory method and/or field blanks to be considered qualitatively. This has been indicated by placing a "B" qualifier next to the positive results for TOC in all surface water samples on the data summary tables.
- The positive results and/or detection limits reported for arsenic, selenium and thallium in all water samples should be considered biased low quantitative estimates and may be higher than reported. The associated matrix spike recoveries were below the established quality control (QC) limit for these analytes. The low recoveries indicate the presence of matrix interferences in samples of a similar matrix. This has been indicated by placing "J" qualifiers next to the positive results and/or detection limits for these analytes on the data summary tables. The possibility of elevated detection limits should be noted when assessing the data for the qualitative absence of arsenic, selenium and thallium in these samples.

 Surface water sample GL-WS-SW-1 and it's field duplicate sample, GL-WS-SW-1DUP, were submitted to the laboratory to evaluate sampling and analytical field precision for those inorganic parameters determined to be confidently detected. Field duplicate analysis precision was determined by comparison of the analytical results for these duplicate samples and calculation of the relative percent difference (RPD) between the positive analytical results detected for the specific parameters.

ERM's blind field duplicate precision criteria of 25% for inorganic parameters was met for all positive results with the exception of the inorganic parameter lead which was detected in only one of the duplicate samples. The positive result for lead in surface water sample GL-WS-SW-1Dup has been marked with a "J" qualifier to indicate that it is a quantitative estimate.

4.0 SUMMARY

The organic and inorganic analyses were performed acceptably, but required a few qualifying statements. This analytical quality assurance report has identified the aspects of the data which required qualification. A support documentation package has been prepared for this quality assurance review and is located with the Lubrizol Corporation project file.

Attachment 1 Methodology Summary and Method References

METHODOLOGY SUMMARY

Analysis for Volatile Organic Compounds by GC/MS

Soil samples were analyzed for volatile organic compounds by adding a five-gram (wet weight) sample aliquot to 5 milliliters (mL) of reagent water containing surrogate compounds and internal standards. Aqueous samples (5 mL) were fortified directly with surrogate compounds and internal standards for analysis. The soil or water samples were then purged with helium at ambient temperature. The volatile compounds were transferred from the aqueous phase to the vapor phase and trapped onto a sorbent column. After purging, the column was heated and back flushed to desorb the compounds onto a gas chromatographic column. The gas chromatograph was temperature programmed to separate the sample components, which were then detected by a mass spectrometer. The target compounds were qualitatively identified and quantitated through calibration with standards.

Analysis for Semivolatile Organic Compounds by GC/MS

Thirty grams (wet weight) of soil were extracted with 1:1 methylene chloride and acetone. Aqueous samples (1000 mL) were adjusted to the appropriate pH and extracted with methylene chloride. The extracts were then filtered, dried, and concentrated to the appropriate volume. The extracts were then analyzed by first separating the extract components using a gas chromatographic column and then detecting them with a mass spectrometer for qualitative and quantitative evaluation.

Analysis for ICP Metals

Prior to analysis, 100- milliliter or one gram sample aliquots were digested with nitric and hydrochloric acids for aqueous analysis. The solution resulting from the metals digestion was analyzed by Inductively Coupled Plasma (ICP) Emission Spectroscopy.

Analysis for Arsenic and Selenium,

One hundred-milliliter sample or one gram sample aliquots were digested with nitric and hydrogen peroxide for aqueous analysis. The resulting solutions were analyzed by graphite furnace atomic absorption (GFAA).

Analysis for Mercury

Aqueous and solid samples analyzed for mercury were oxidized with potassium permanganate. Mercury was reduced to its elemental form and aerated from solution in a closed system. Mercury was then determined with a cold vapor atomic absorption spectrophotometer.

Analysis for Chemical Oxygen Demand

The sample is refluxed with sulfuric acid and a known excess of dichromate. The remaining dichromate is titrated with ferrous ammonium sulfate and oxidizable organic matter is calculated in terms of the oxygen equivalent. Inorganic material that is oxidized by the dichromate (eg. S-, Fe+2) will also be measured as COD.

Analysis for Total Organic Carbon

A small amount of sample (1-100 mg) is weighed into a 10cc ampule. Measured amounts of potassium persulfate, phosphoric acid and deionized water are added to the ampule. The ampule is then purged with UPC oxygen, sealed, and autoclaved for 45 minutes at 120° C. The carbon dioxide formed is purged from the ampule, trapped, and read by a nondispersive infrared detector (NDIR). The carbon dioxide detected is thus used to determine the mass of the TOC in the sample.

Analysis for Alkalinity

The sample is titrated to an electrometrically determined end point of pH 4.5.

Hardness

Calcium and magnesium ions in the sample are sequestered upon the titrimetric addition of disodium ethylenediamine-tetraacetate. The end point of the titration is determined visually.

METHOD REFERENCES

Analysis	References
Volatile Organic Compounds	Test Methods for Evaluating Solid Wastes, SW-846, 3rd Edition, (USEPA 1986), Method 8240B.
Semivolatile Organic Compounds	Test Methods for Evaluating Solid Wastes, SW-846, 3rd Edition, (USEPA 1986), Method 8270B.
Total Metals	Test Methods for Evaluating Solid Wastes, SW-846, 3rd Edition, (USEPA 1986, updated July 1992), Methods 6010A, 7060, 7470A, 7471A, and 7740.
Alkalinity	Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, March 1983 and subsequent revisions. Method 310.1.
Chemical Oxygen Demand	Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, March 1983 and subsequent revisions. Method 410.4.
Total Hardness	Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, March 1983 and subsequent revisions. Method 130.2.
Total Organic Carbon	Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, March 1983 and subsequent revisions. Method 415.1.
Total Organic Carbon	90-3, Standard Methods of Chemical Analysis, 6 th Edition, 1963.

Attachment 2 Data Summary Tables

Aqueous Analytical Results Volatile Organic Compounds-Indicator Chemicals The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GI-WS-S	W-1	GL-WS-SW	-1DUP	GL-WS-S	W-2	GL-WS-9	W-3	GL-WS-S	W-4	GL WS	BR	TRIP BLA	NK
DATE COLLECTED:		7/31/9	77	7/31/	97	7/31/9	97	7/31/	97	7/31/9	97	7/31/9	97	7/31/9	97
MATRIX:	!	AQUEO	US	AQUEC	ous	AQUEO	บร	AQUEC	บร	AQUEO	US	AQUEO	บร	AQUEO	บร
MOISTURE CONTENT:		N/A		N/A	. [N/A		N/A		N/A		N/A		N/A	
ANALYTE	UNITS														
Acetone	μg/L	20	U	20	υ }	20	บ	33	υ	20	U	20	ប	20	υ
Benzene	μg/L	5.0	U	5.0	ប	5.0	ប	8.3	υ	5.0	U	5.0	U	5.0	υ
2-Butanone	μg/L	20	U	20	ប	20	บ	33	υ	20	U	20	U	20	υ
lithylbenzene	µg/L	5.0	U	5.0	บ	5.0	U	8.3	U	5.0	U	5.0	U	5.0	บ
4-Methyl-2-pentanone	μg/L	20	U	20	U	20	υ	33	บ	20	ប	20	ប	20	υ
Tolucne	μg/L	5.0	U	5.0	υ	5.0	υ	8.3	ប	5.0	U	5.0	U	5.0	υ
Xylene (total)	μg/L	5.0	υ	5.0	บ	5.0	บ	8.3	U	5.0	U	5.0	U	5.0	U
		Ĺ		L											

- J This result should be considered a quantitative estimate.
- B This result is qualitatively invalid since this compound was detected in a blank at a similar concentration.
- U This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.
- UJ This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitive estimate.
- N/A Not applicable.

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Date 44-21-48

Volatile Organic Compounds-Indicator Chemicals The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

	_			•		, ,					
SAMPLE LOCATION: DATE COLLECTED: PERCENT MOISTURE:		GL-SS-SED-1 7/31/97 24		GL-SS-SED-1DUF 7/31/97 24	'	GU-SS-SED-2 7/31/97 34		GL-SS SED-3 7/31/97 22		GL SS SED 4 7/31/97 27	-
ANALYTE	UNITS				ı		- 1				
Acetone	ид/Кд	26	บ	26	U	30	u	26	υ	74	
Benzene	µg/Kg	6.5	υ	6.6	υİ	75	U	6.4	Ū	69	, U
2-Butanone	ng/Kg	26	บ	26	υ{	30	υ	26	υ	17	1
Ethylbenzene ,	µg/Kg	6.5	υ[6.6	u	7.5	U	6.4	u	6.9	ú
4 Methyl-2-pentanone	pg/kg	26	U	26	u	30	U	26	Ü	28	11
Foluene	μg/Kg	65	U	6.6	υ	7.5	υ	6.4	U	6.9	11
Xylene (total)	ng/Kg	6.5	U	6.6	U	7.5	U	6.4	- U	69	Ü
	ţ		- 1		- (ļ		Ì		_

- J. This result should be considered a quantitative estimate.
- B This result is qualitatively invalid since this compound was detected in a blank at a similar concentration
- U This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound
- UI This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitive estimate.

N/A - Not applicable

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معدالي واكر	Rev
	Date 9-10-97

See volatile Organic Compounds-Indicator of micals The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		GL-WS-S	W-1	GL-WS-SW-1DUP		GL-WS-9	SW-2	GL-WS-S	W-3	GL-WS-S	W-4	GL-WS	-ER
DATE COLLECTED:		7/31/9	97	7/31/	97	7/31/	97	7/31/	97	7/31/9	97	7/31/	97
MATRIX:		AQUEO	US	AQUEC	US	AQUEC	us	AQUEC	US	AQUEO	US	AQUEC	ous
MOISTURE CONTENT:		N/A		N/A	. j	N/A		N/A	.]	N/A		N/A	
ANALYTE	UNITS												
bis(2-Ethylhexyl) phthalate	μg/L	10	U	8.4	j (10	บ	10	U	10	υ	10	U
1,2-Dichlorobenzene	μg/L	10	U	10	υ	10	U	10	υ	10	U	10	U
Fluoranthene	μg/L	10	U	10	υ	10	U	10	υ	10	U	10	U
Isophorone	μg/L	10	U	10	ี บ)	10	U	10	U	10	U	10	U
2-Methylnaphthalene	μg/L	10	U	10	υ	10	υ	10	υ	10	U	10	U
2-Methylphenol	μg/L	10	U	10	υ	10	U	10	UJ 🛭	10	U	10	U
4-Methylphenol	μg/L	10	U	10	υļ	10	U	10	UJ	10	U	10	U
Naphthalene	μg/L	10	U	10	บ	10	U	10	U	10	U	10	U
Phenol	μg/L	10	U	10	υ	10	U	10	UJ	10	ប	10	U
1,2,4-Trichlorobenzene	μg/L	10	U	10	U	10	U	10	υ	10	U	10	U

- J This result should be considered a quantitative estimate.
- B This result is qualitatively invalid since this compound was detected in a blank at a similar concentration.
- U This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.
- UJ This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitive estimate.
- N/A Not applicable.

Semivolatile Organic Compounds-Indicator Chemicals The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:	1	GUSS SED 1	Ī	GL SS SED 1DUP	- 1	GL/SS SED 2	- 1	GL SS SED 3	· · · }	GL 58 SED 4	
DATE COLLECTED:	}	7/31/97	ì	7/31/97	1	7/31/97]	7/31/97		7/31/97	
PERCENT MOISTURE:		24	ŀ	24	1	34	l	22		27	
ANALYTE	UNITS		ł				ŀ		l l		
bis(2-Ethylhexyl) phthalate	µg/Kg	430	U	440	U	60	1	430	u	450	$\mathbf{v}^{!}$
1,2-Dichlorobenzene	μg/Kg	430	υ	440	บ	500	ΰ	430	υ	450	Ū
Fluoranthene	μg/Kg	430	υ	440	บ	500	U	430	u]	450	U
Isophorone	µg/Kg	430	U	440	υÌ	500	υľ	430	υl	450	U
2-Methylnaphthalene	µg/Kg	430	U	440	υf	500	υl	430	υĺ	450	\mathbf{u}'
2 Methylphenol	μg/Kg	430	υ	440	U	500	U	430	U	450	til
4 Methylphenol	μg/Kg	430	υĮ	440	u	500	U	430	U	450	U
Naphthalene	ng/Kg	430	υl	440	u	500	υĺ	430	u)	450	U
Phenol	μg/Kg	430	U	440	u	500	U	430	U	450	U
1,2,4-Trichlorobenzene	μg/Kg	430	U	440	U	500	U	430	U)	450	U
l	Ì		i						l		

- J. This result should be considered a quantitative estimate
- B. This result is qualitatively invalid since this compound was detected in a blank at a similar concentration
- U This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound
- UJ This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitive estimate.

N/A - Not applicable.

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Date 9-10-97

Total Metals-Indicator Chemicals The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMI'LE LOCATION:		GL-WS-SW-1	1	GL-WS-SW-1DUP		GL-WS-SW-2		GL-WS-SW-3	ł	GL-WS-SW-4		GL-WS-ER	
DATE COLLECTED:		7/31/97		7/31/97		7/31/97		7/31/97	-	7/31/97		7/31/97	
MOSITURE CONTENT:		N/A	-	N/A	1	N/A		N/A	l	N/A		N/A	}
MATRIX:		AQUEOUS	l	AQUEOUS		AQUEOUS		AQUEOUS		AQUEOUS		AQUEOUS	
ANAYTE	UNITS												
Antimony	mg/L	0.010	υ	0.010	υ	0.010	υ	0.010	υ	0.010	U	0.010	U
Arsenic	mg/L	0.010	UJ	0.010	UJ	0.010	UJ	0.010	UJ	0.010	UJ	0.010	UJ
Beryllium	mg/L	0.0050	υ	0.0050	υ	0.0050	υ	0.0050	U	0.0050	υ	0.0050	υ
Cadmium	mg/L	0.0020	υ	0.0020	U	0.0020	υ	0.0020	U	0.0020	U	0.0020	U
Chromium	mg/L	0.0050	U	0.0050	υ	0.0050	υ	0.0050	υ	0.0050	U	0.0050	U
Cobalt	mg/L	0.050	υ	0.050	U	0.050	υ	0.050	U	0.050	U	0.050	υ
Copper	mg/L	0.025	υ	0.025	U	0.025	U	0.025	U	0.025	U	0.025	υ
Lead	mg/L	0.0030	υ	0.0061	J	0.0030	U	0.0030	υ	0.0030	U	0.0030	U
Mercury	mg/L	0.00020	υ	0.00020	Ü	0.00020	U	0.00020	υ	0.00020	U	0.00020	U
Nickel	mg/L	0.040	υ	0.040	บ	0.040	U	0.040	U	0.040	U	0.040	υ
Selenium	mg/L	0.0050	UJ	0.0050	UJ	0.0050	UJ	0.0050	UJ	0.0050	UJ	0.0050	UJ
Silver	mg/L	0.0050	υ	0.0050	U	0.0050	บ	0.0050	υ	0.0050	U	0.0050	U
Thallium	mg/L	0.010	UJ	0.010	UJ	0.010	UJ	0.010	UJ	0.010	UJ	0.010	UJ
Zinc	mg/L	0.050	U	0.050	U	0.050	יט	0.050	U	0.050	U	0.050	ט
Inorganic Analysis													
Alkalinity	mg/L	250		260		250		240		240		NΛ	
Chemical Oxygen Demand	mg/L	10	υ	10	U	10	U	10	υ	10	U	NΛ	l
Total Hardness	mg/L	410		410		420		400		390		NΛ	l
Total Organic Carbon	mg/L	4	В	4	В	4	В	4	В	4	В	1	

J - This result should be considered a quantitative estimate.

N/A - Not applicable.

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B - This result is qualitatively invalid since this compound/analyte was detected in a blank at a similar concentration.

U - This compound/analyte was analyzed but not detected. The numerical value represents the quantitation/detection limit of the compound/analyte.

UJ - This compound/analyte was analyzed but not detected. The numerical value that represents the quantitation limit of the compound/analyte is a quantitive estimate.

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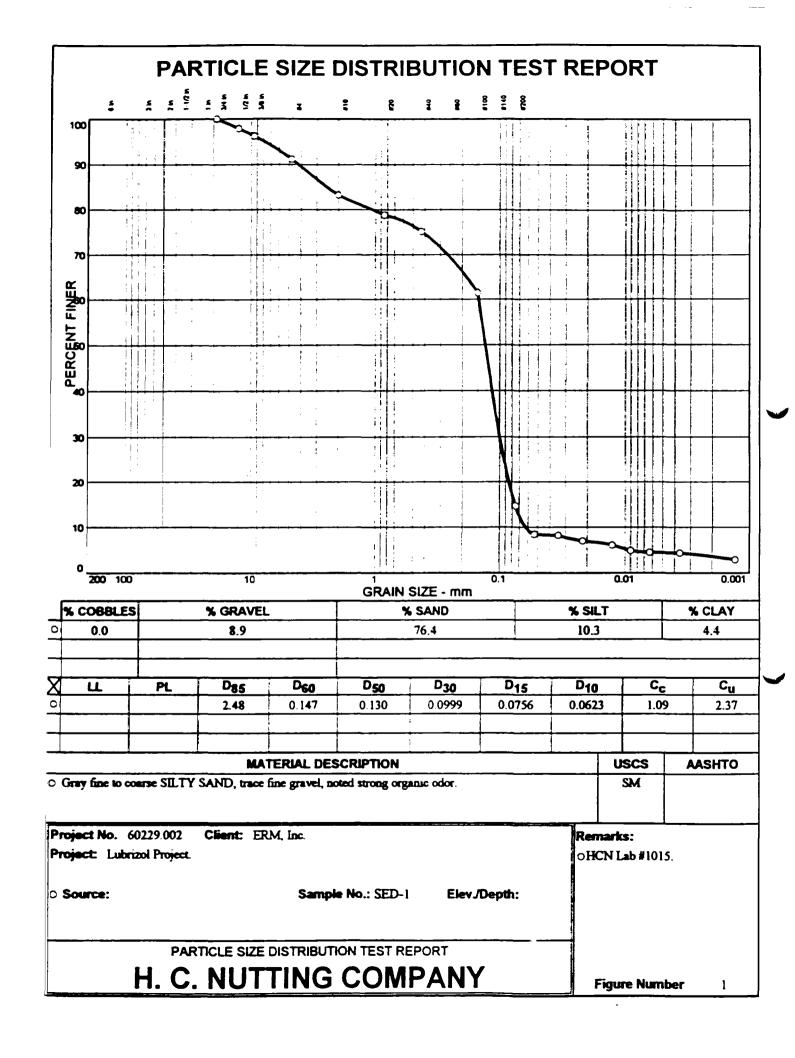
The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

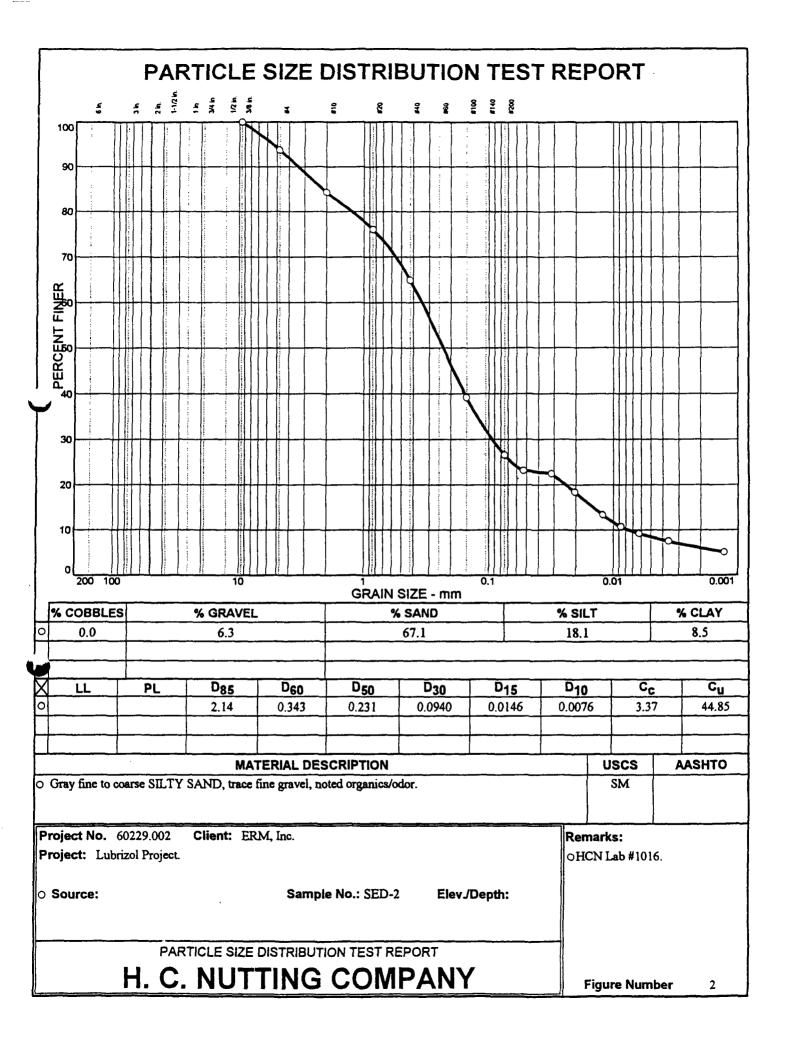
SAMPLE LOCATION		GL/SS/SED/1		GL SS SED 1DU	JP T	GL SS 5ED 2	T	GUSS SED 3		GL 88 SLD 4	
DATE COLLECTED		7/31/97		7/31/97		7/11/97		7/31/97		7/11/97	
MOSITURE CONTENT		23.6		24.4		33.7		22 4		27.4	
ANAYTE	UNITS							•			
Metals											
Antimony	n\g/kg	1.3	UJ	1.3	UJ	1.5	UJ	1.3	U)	1.4	UJ
Arsenic	mg/kg	40	1	33		3.9	- 1	4 2	1	64	1
Beryllium	mg/kg	0.65	U	0.66	U	0.75	υ	0 64	U	0 69	U
Cadmium	mg/kg	0.26	บ	0.26	U	0.30	υÌ	0.26	U	0.28	U
Chromium	mg/kg	66		4.5		9.8	ŀ	6.2	ŀ	9 ()	
Copper	mg/kg	H 1	J	н з	J	110	1	13.4	1	15.6	J
l rad	mg/kg	46	J	4.5	1	H 4	1	6.3	1	10.3	1
Mercury	mg/kg	0.13	U	0.13	υ	0.15	υ	0.13	υ	0.14	U
Nickel	mg/kg	8.6		81		15.5		12 7	ŀ	167	
Selenium	mg/kg	0.65	UJ	0.66	UJ	1.5	UJ	0.64	UJ	1.4	UJ
Silver	mg/kg	0.65	U	0.66	U	0.75	υ	0.64	U	0.69	U
Thallium	mg/kg	1.3	U	1.3	U	1.5	υ	1.3	U	1.4	IJ
Zinc	mg/kg	33.5		28.1		52.3		39 ()		77 2	
Inorganic Analysis											
Total Organic Carbon	mg/kg	710	В	820		5200		4300		33(0)	

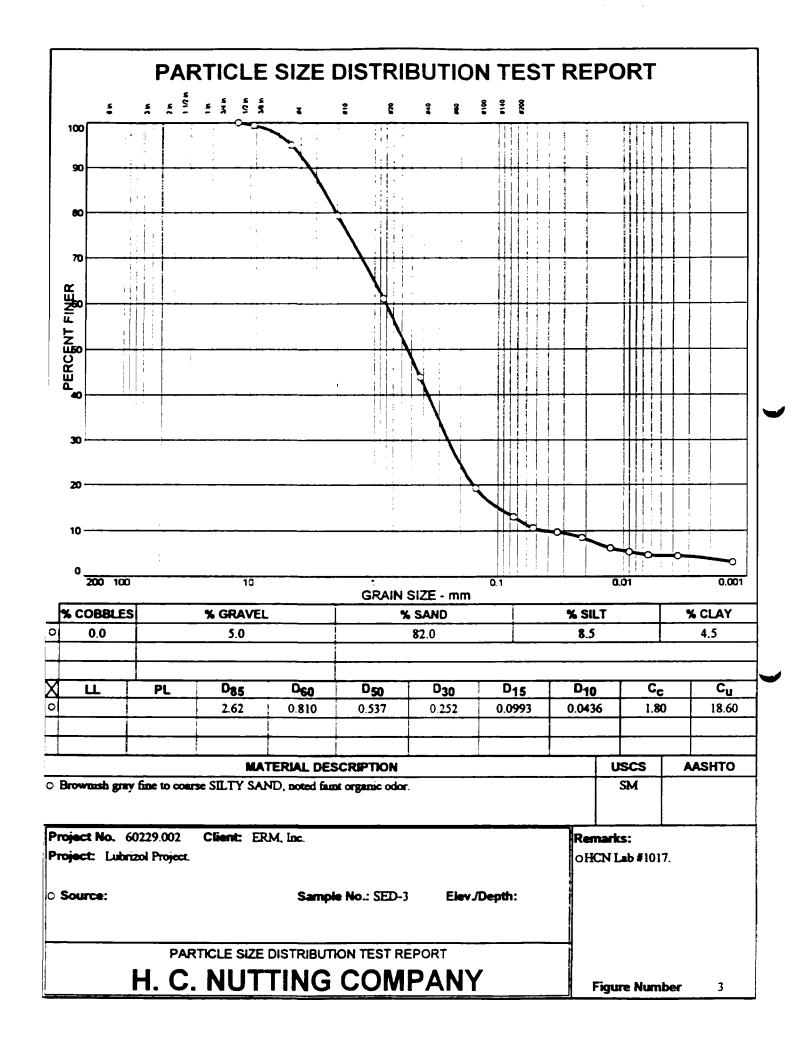
- J This result should be considered a quantitative estimate.
- B This result is qualitatively invalid since this compound/analyte was detected in a blank at a similar concentration.
- U This compound/analyte was analyzed but not detected. The numerical value represents the quantitation/detection limit of the compound/analyte.
- UJ This compound/analyte was analyzed but not detected. The numerical value that represents the quantitation limit of the compound/analyte is a quantitive estimate.
- N/A · Not applicable.

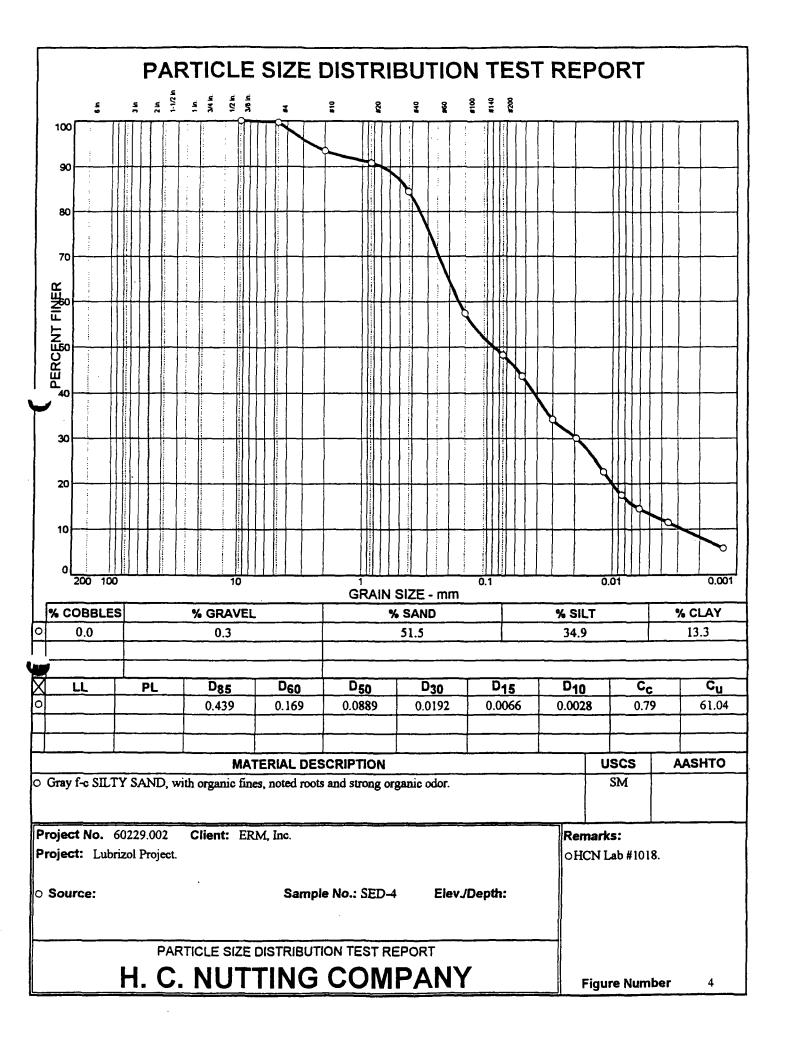
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Grain Size Testing Results









Appendix J Summary of Analytical Data Sets and Statistical Analysis for Risk Assessment

Summary of Volatile Organics Data for On Site Soil 0-14 Feet Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-SS-S	M-1	M-1 GL-SS-SM-2 GL-SS-SM-3 GL-SS-SM- 3'-5' 5'-7' 5'-7'		M-4	GL-SS-SN	v1-5	GL-SS-SM-5 D	U P	GL-SS-S	SM-5	GL-SS-S	M-6			
Sample Depth	5'-7'		3'-5'		5'- <i>7</i> '		5'-7'		5'- <i>7</i> '		5'-7'		11'-1	3'	5'-7'	
Volatile Organics	anics nane 1800 U 1500 U 2100 U 17 nane 1800 U 1500 U 2100 U 17 de 1800 U 1500 U 2100 U 17															
Chloromethane	1800	U	1500	U	2100	U	17000	U	7300	U	29000	U	5100	U	1500	ι
Bromomethane	1800	U	1500	U	2100	U	17000	U	7300	υ	29000	U	5100	U	1500	Į
Vinyl chloride	1800	U	1500	U	2100	U	17000	ប	7300	U	29000	U	5100	U	1500	ι
Chloroethane	1800	ប	1500	U	2100	ប	17000	U	7300	U	29000	U	5100	U	1500	1
Methylene chloride	900	U	750	U	1000	U	8300	U	3600	Ŭ	14000	U	2600	U	770	1
Acetone	2200	В	1100	В	1500	iВ	7100	В	19000	В	6600	В	32000		5900	
Carbon disulfide	900	Ū	750	U	1000	U	8300	บ	3600	U	14000	U	2600	U	<i>7</i> 70	1
1,1-Dichloroethene	900	U	750	U	1000	บ	8300	บ	3600	U	14000	U	2600	U	770	1
1,1-Dichloroethane	900	Ū	750	U	1000	υ	8300	บ	3600	U	14000	U	2600	U	770	Į
1,2-Dichloroethene (total)*	900	U	750	U	1000	บ	8300	U	3600	Ŭ	14000	U	2600	U	770	Į
Chloroform	900	Ū	750	U	1000	U	8300	U	3600	บ	14000	U	2600	U	770	Ţ
1,2-Dichloroethane	900	U	750	U	1000	υ	8300	ប	3600	U	14000	U	2600	IJ	770	1
2-Butanone	910	J	3000	ប	1900	J	33000	U	15000	U	58000	U	10000	υ	3100	ı
1,1,1-Trichloroethane	900	Ù	750	U	1000	Ù	8300	U	3600	υ	14000	U	2600	U	770	i
Carbon tetrachloride	900	U	750	U	1000	U	8300	บ	3600	Ŭ	14000	U	2600	U	770	1
Bromodichloromethane	900	Ū	750	U	1000	U	8300	U	3600	U	14000	U	2600	U	770	1
1,2-Dichloropropane	900	υ	750	U	1000	บ	8300	บ	3600	U	14000	U	2600	U	770	1
cis-1,3-Dichloropropene	900	U	750	U	1000	ប	8300	U	3600	U	14000	U	2600	U	770	Į
Trichloroethene	900	U	750	U	1000	U	8300	U	3600	U	14000	U	2600	U	770	Į
Dibromochloromethane	900	U	750	U	1000	U	8300	U	3600	U	14000	U	2600	U	770	1
1,1,2-Trichloroethane	900	Ü	750	U	1000	U	8300	U	3600	U	14000	U	2600	υ	770	1
Benzene	860	}	350	J	1000	U	5600	J	1800	J	8600	j	2600	U	770	1
trans-1,3-Dichloropropene	900	Ù	750	Ü	1000	บ	8300	U	3600	U	14000	U	2600	U	770	1
Bromoform	900	ប	750	U	1000	ប	8300	U	3600	U	14000	U	2600	U	770	1
4-Methyl-2-pentanone	8700	J	6800	J	8100		28000	J	46000	J	80000	J	55000		23000	
2-Hexanone	3600	Ú	3000	Ù	4200	บ	33000	Ū	15000	U	58000	U	10000	U	3100	1
Tetrachloroethene	900	U	750	U	1000	U	8300	U	3600	U	14000	υ	2600	U	770	
1,1,2,2-Tetrachloroethane	470	J	750	υ	1000	υ	8300	ប	3600	U	14000	U	2600	U	770	
Toluene	12000	•	11000		1300		140000		5600	J	34000	J	2600	U	2100	
Chlorobenzene	900	U	750	U	1000	U	8300	U	3600	Ü	14000	Ū	2600	U	770	
Ethylbenzene	7000		8100		1000	บ	76000		3700	J	23000	J	2600	U	730	
Styrene	900	U	3800		1000	U	8300	U	3600	Ū	14000	U	2600	U	. 770	
Xylenes (total)	34000		38000		2000		340000		22000	J	140000	J	2600	υ	3500	
Vinyl acetate	1800	Ū	1500	U	2100	U	17000	U	7300	Ú	29000	Ŭ	5100	U	1500	

All results are reported in units of ug/kg.

DUP = Duplicate sample

Blank spaces indicate that a constituent was not analyzed for in a given sample.

Results for 1,2-Dichloroethene in samples GL-SS-SB-1 through GL-SS-SB-13 reprsent concentrations of cis-1,2-Dichloroethene.

Summary of Volatile Organics Data for On Site Soil 0-14 Feet Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL/SS-SN 11'-13'		GL-95-5N 3'-5'	1-7	GL-86-51 7-9	M-7	GL:88-8		GL/SS-SM-		GL/SS-SN	4-8	GL-SS-SI	4-8	GL/SS-SM	1-8	GLASSASI	
Sample Depth Volatile Organics	11-13		3.•3.		7.4		11'-1:	3.	11'-13) ^r	0'-1'		3'-5'		7'-9'		11'-13	<u>. </u>
Chloromethane	3100	υ	3100	υ	1500	υ	120	υ	12	υ	30000	υ	30000	U	7400	U	3000	U
Bromomethane	3100	Ū	3100	Ū	1500	Ū	120	Ū	12	Ü	30000	Ū	30000	Ū	7400	ΰ	3000	Ü
Vinyl chloride	3100	Ū	3100	Ū	1500	Ū	120	Ū	12	Ü	30000	Ū	30000	Ü	7400	Ū	3000	Ü
Chloroethane	3100	Ū	3100	Ū	1500	Ū	120	Ū	12	Ū	30000	Ū	30000	Ū	7400	Ū	3000	Ü
Methylene chloride	1600	U	1500	Ü	770	U	60	U	6.2	Ū	15000	Ü	15000	Ū	3700	Ū	1500	ŭ
Acetone	27000		4500	В	16000	1	6500	ĵ	60	В	61000	Ū	21000	В	7100	В	6800	В
Carbon disulfide	1600	U	1500	U	770	U	60	Ú	6.2	U	15000	U	15000	U	3700	U	1500	U
1,1 Dichloroethene	1600	U	1500	U	770	U	60	U	6.2	บ	15000	U	15000	U	3700	U	1500	U
1,1 Dichloroethane	1600	U	1500	U	770	U	60	U	6.2	υ	15000	U	15000	U	3700	U	1500	U
1,2-Dichloroethene (total)*	1600	U	1500	U	770	U	60	U	6.2	U	15000	U	15000	U	3700	U	1500	U
Chloroform	1600	υ	1500	U	770	υ	60	υ	6.2	υ	15000	υ	15000	υ	3700	U	1500	U
1,2-Dichloroethane	1600	U	1500	U	770	U	60	U	6.2	U	15000	U	15000	U	3700	U	1500	U
2-Butanone	6300	U	6100	U	3100	U	74	J	3.6	J	61000	U	59000	U	15000	U	6000	U
1,1,1 Trichloroethane	1600	U	1500	U	770	U	60	Ü	6.2	Ú	15000	U	15000	U	3700	U	1500	U
Carbon tetrachloride	1600	U	1500	U	770	U	60	U	6.2	υ	15000	U	15000	U	3700	U	1500	U
Bromodichloromethane	1600	υ	1500	υ	770	υ	60	υ	6.2	υ	15000	υ	15000	υ	3700	υ	1500	υ
1,2 Dichloropropane	1600	U	1500	U	770	U	60	U	6.2	U	15000	U	15000	U	3700	U	1500	U
cis-1,3-Dichloropropene	1600	υ	1500	U	770	U	60	U	6.2	U	15000	U	15000	U	3700	U	1500	U
Trichloroethene	1600	U	1400	J	770	U	60	U	6.2	บ	9500	J	7700	J	2100	J	1500	U
Dibromochloromethane	1600	U	1500	U	770	U	60	υ	6.2	U	15000	U	15000	U	3700	U	1500	U
1,1,2-Trichloroethane	1600	U	1500	υ	770	υ	60	υ	6.2	υ	15000	υ	15000	U	3700	υ	1500	U
Benzene	1600	U	4300		770	U	60	U	6.2	U	27000		25000		5200		880	J
trans 1,3 Dichloropropene	1600	U	1500	U	770	U	60	U	6.2	U	15000	U	15000	U	3700	U	1500	U
Bromoform	1600	U	1500	U	770	U	60	U	6.2	U	15000	U	15000	U	3700	U	1500	U
4-Methyl-2-pentanone	35000		50000	J	28000		490	j	16	В	100000	J	140000		45000	J	18000	j
2-Hexanone	6300	U	6100	บ	3100	υ	240	υ	25	υ	61000	υ	59000	บ	15000	U	6000	υ
Tetrachloroethene	1600	U	1500	U	770	U	60	U	6.2	U	15000	U	15000	U	3700	U	1500	U
1,1,2,2-Tetrnchloroethane	1600	U	1500	U	770	U	60	U	6.2	บ	15000	U	15000	U	3700	U	1500	U
Toluene	1600	U	43000		1200		51	J	6.2	υ	330000		290000		81000		11000	
Chlorobenzene	1600	U	1500	U	770	U	60	U	6.2	U	15000	U	15000	U	3700	U	1500	U
Ethylbenzene	1600	υ	10000		770	υ	60	บ	6.2	ប	97000		110000		30000		5000	
Styrene	1600	U	1500	U	770	U	60	U	6.2	บ	15000	U	15000	U	3700	U	1500	U
Xylenes (total)	1600	U	51000		560	j	41	J	6.2	บ	460000		520000		150000		24000	
Vinyl acetate	3100	U	3100	U	1500	U	120	U	12	U	30000	U	30000	U	7400	U	3000	U

All results are reported in units of ug/kg.

DUP = Duplicate sample

Blank spaces indicate that a constituent was not analyzed for in a given sample.

Results for 1,2-Dichloroethene in samples GL-SS-SB-1 through GL-SS-SB-13 represent concentrations of cis-1,2-Dichloroethene.

Sample Location	GL-SS-S	M-9			GL-SS-SI	M-10	GL-SS-S	M-10	GL-SS-SN	M-10	GL-SS-9	SS	GL-SS-S	B-1		
Sample Depth	4'-6'	1	6'-8	•	12'-14	4'	4'-6'		6'-8	; '	12'-14	t'	0'-1'		6-8	
Volatile Organics				-												
Chloromethane	12	U	12	U	13	U	12	U	12	U	13	U	2600	U		
Bromomethane	12	U	12	U	13	U	12	U	12	U	13	U	2600	U		
Vinyl chloride	12	U	12	บ	13	U	12	U	12	U	13	U	2600	U	1500	U
Chloroethane	12	U	12	ប	13	U	12	U	12	บ	13	U	2600	U		
Methylene chloride	6.1	U	6.2	ប	6.3	ប	6.2	U	6	U	6.3	U	1300	U		
Acetone	25	U	12	J	33	i	25	U	71		36		1300	В	3000	U
Carbon disulfide	6.1	U	6.2	Ü	6.3	U	6.2	U	6	บ	6.3	U	1300	U	750	U
1,1-Dichloroethene	6.1	U	6.2	U	6.3	υ	6.2	U	6	U	6.3	U	1300	U	750	U
1,1-Dichloroethane	6.1	U	6.2	U	6.3	U	6.2	U	6	U	6.3	U	1300	U		
1,2-Dichloroethene (total)*	6.1	U	6.2	U	6.3	U	6.2	U	6	U	6.3	บ	1300	U	380	U
Chloroform	6.1	U	6.2	บ	6.3	U	6.2	U	6	U	6.3	U	1300	U		
1,2-Dichloroethane	6.1	U	6.2	บ	6.3	U	6.2	U	6	U	6.3	U	1300	U		
2-Butanone	25	U	2.5	J	<i>7</i> .5	J	25	U	4.9	J	4.0	J	5200	υ	3000	U
1,1,1-Trichloroethane	6.1	U	6.2	Ü	6.3	Ü	6.2	U	6	Ū	6.3	Ū	1300	U		
Carbon tetrachloride	6.1	U	6.2	U	6.3	U	6.2	บ	6	U	6.3	υ	1300	U		
Bromodichloromethane	6.1	U	6.2	U	6.3	υ	6.2	U	6	U	6.3	U	1300	U		
1,2-Dichloropropane	6.1	U	6.2	U	6.3	U	6.2	U	6	U	6.3	U	1300	U		
cis-1,3-Dichloropropene	6.1	U	6.2	ប	6.3	υ	6.2	U	6	U	6.3	U	1300	U		
Trichloroethene	6.1	U	6.2	U	6.3	U	6.2	U	6	U	6.3	U	1300	Ū	750	U
Dibromochloromethane	6.1	U	6.2	U	6.3	U	6.2	U	6	U	6.3	U	1300	U		
1,1,2-Trichloroethane	6.1	U	6.2	U	6.3	U	6.2	U	6	U	6.3	U	1300	U		
Benzene	6.1	U	6.2	บ	6.3	U	6.2	U	4.9	J	6.3	U	1300	U	750	U
trans-1,3-Dichloropropene	6.1	U	6.2	U	6.3	U	6.2	U	6	U	6.3	U	1300	U		
Bromoform	6.1	U	6.2	U	6.3	U	6.2	U	6	U	6.3	ប	1300	U		
4-Methyl-2-pentanone	25	U	25	U	7.9	J	25	U	5.6	J	3.9	J	5200	U	10000	
2-Hexanone	25	U	25	U	5.3	J	25	U	24	U	25	U	5200	· U		
Tetrachloroethene	6.1	U	6.2	U	6.3	U	6.2	U	6	U	6.3	U	1300	U		
1,1,2,2-Tetrachloroethane	6.1	U	6.2	U	6.3	U	6.2	U	6	U	6.3	U	1300	ប		
Toluene	6.1	Ŭ	6.2	U	6.3	U	6.2	U	6	U	6.3	U	1300		750	U
Chlorobenzene	6.1	U	6.2	U	6.3	U	6.2	U	6	U	6.3	U	1300	U		
Ethylbenzene	6.1	ប	6.2	บ	6.3	ប	6.2	U	. 6	U	6.3	Ü	3500		750	U
Styrene	6.1	U	6.2	U	6.3	U	6.2	U	6	U	6.3	U	1300	U	750	U
Xylenes (total)	6.1	U	6.2	U	6.3	U	3.6	J	6	U	6.3	ប	26000		750	U
Vinyl acetate	12	Ū	12	ប	13	U	12	U	12	U	13	U	2600	U		

All results are reported in units of ug/kg.

DUP = Duplicate sample

Blank spaces indicate that a constituent was not analyzed for in a given sample.

Results for 1,2-Dichloroethene in samples GL-SS-SB-1 through GL-SS-SB-13 reprsent concentrations of cis-1,2-Dichloroethene.

Summary of Volatile Organics Data for On Site Soil 0-14 Feet Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-88-8	H-2	GL-SS-9	5H-3	GL-56-5	B-4	GL-86-8B-4 D	บท	GL-SS-SB-5	MW-2)	GL- SS -S	B-6	GL-SS-5	iB-7	GL-88-9	SH-8
Sample Depth	6-8		6-8		8-10	1	8-10		6-8		4-6		6-8		4-(6
Volatile Organics																
Chloromethane																
Bromomethane																
Vinyl chloride	3100	U	12	U	2600	U	1500	U	12	U	12	U	12	u	12	U
Chloroethane																
Methylene chloride																
Acetone	8400		63	J	19000	١j	27000	J	13	j	23	υ	10	j	48)
Carbon disulfide	1500	U	5.8	U	1300	U	760	U	6.2	Ü	5.8	U	6.1	Ù	6	ù
1,1-Dichloroethene	1500	U	5.8	U	1300	U	760	U	6.2	U	5.8	U	61	υ	6	U
1,1-Dichloroethane																
1,2 Dichloroethene (total)*	760	U	2.9	U	640	U	180	U	3.1	U	2.9	U	3	U	3	U
Chloroform																
1,2 Dichloroethane																
2 Butanone	6100	U	23	U	5100	U	3100	U	25	U	23	U	24	U	24	U
1,1,1-Trichloroethane																
Carbon tetrachloride																
Bromodichloromethane																
1,2 Dichloropropane																
cis-1,3 Dichloropropene																
Trichloroethene	1500	U	5.8	U	1300	υ	760	U	6.2	U	5.8	U	6.1	U	6	U
Dibromochloromethane																
1,1,2-Trichloroethane																
Benzene	1500	υ	3.9	J	1300	U	760	U	4.0	j	5.8	U	6.1	U	6	υ
trans-1,3-Dichloropropene				•												
Bromoform																
4-Methyl-2-pentanone	50000		23	U	39000		30000		25	υ	23	U	24	U	7.7	В
2-Hexanone																
Tetrachloroethene																
1,1,2,2-Tetrachloroethane																
Toluene	1500	U	5.8	U	1300	U	760	U	6.2	U	5.8	U	6.1	U	6	U
Chlorobenzene																
Ethylbenzene	1500	υ	5.8	บ	1300	U	760	U	6.2	U	5.8	U	6.1	U	6	U
Styrene	1500	U	5.8	บ	1300	U	760	υ	6.2	U	5.8	U	6.1	U	6	U
Xylenes (total)	1500	U	5.8	υ	1300	U	760	U	6.2	U	5.8	U	6.1	U	6	U
Vinyl acetate																

Notes:

All results are reported in units of ug/kg.

DUP = Duplicate sample

Blank spaces indicate that a constituent was not analyzed for in a given sample.

Results for 1,2-Dichloroethene in samples GL-SS-SB-1 through GL-SS-SB-13 represent concentrations of cis-1,2-Dichloroethene.

Summary of Volatile Organics Data for On Site Soil 0-14 Feet

Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-SS-	SB-9	GL-SS-S	B-10	GL-SS-SI	3-11	GL-SS-S	B-12	GL-SS-S	B-13	GL-SS-SB-13	3 DUP	MW-1	3
Sample Depth	4-6	5	6-8	;	0-2		6-8		6-8	3	6-8		8-10'	
Volatile Organics														
Chloromethane														
Bromomethane														
Vinyl chloride	12	U	12	U	23000	U	2000	U	12	U	12	U		
Chloroethane														
Methylene chloride														
Acetone	18	J	14	J	46000	U I	5800	J	9.1	J	41	j	6400	В
Carbon disulfide	6.1	บ	6.1	Ŭ	12000	U	1000	Ü	5.9	Ū	6.1	Ü		
1,1-Dichloroethene	6.1	ប	6.1	U	12000	U	1000	U	5.9	U	6.1	U	750	U
1,1-Dichloroethane														
1,2-Dichloroethene (total)*	3	U	3.1	U	5800	U	510	U	3	U	3.1	U		
Chloroform														
1,2-Dichloroethane														
2-Butanone	24	U	24	U	46000	U	4100	U	24	U	24	U	3000	U
1,1,1-Trichloroethane														
Carbon tetrachloride														
Bromodichloromethane														
1,2-Dichloropropane														
cis-1,3-Dichloropropene														
Trichloroethene	6.1	U	6.1	U	12000	U .	1000	U	5.9	ប	6.1	U	750	U
Dibromochloromethane														
1,1,2-Trichloroethane														
Benzene	6.3		28		12000	U	1000	U	5.9	U	6.1	U	750	U
trans-1,3-Dichloropropene														
Bromoform														
4-Methyl-2-pentanone	24	U	6.3	J	40000	В	40000		24	U	24	U	3000	U
2-Hexanone				-										
Tetrachloroethene										-				
1,1,2,2-Tetrachloroethane														
Toluene	6.1	U	6.1	U	85000		1000	U	5.9	U	6.1	ប	750	U
Chlorobenzene													750	U
Ethylbenzene	6.1	U	6.1	U	48000		1000	U	5.9	U	6.1	U	750	U
Styrene	6.1	U	6.1	U	12000	U	1000	U	5.9	U	6.1	U		
Xylenes (total)	6.1	U	6.1	U	250000		1000	U	5.9	U	6.1	U	750	U
Vinyl acetate		•												

All results are reported in units of ug/kg.

DUP = Duplicate sample

Blank spaces indicate that a constituent was not analyzed for in a given sample.

Results for 1,2-Dichloroethene in samples GL-SS-SB-1 through GL-SS-SB-13 reprsent concentrations of cis-1,2-Dichloroethene.

Summary of Semivolatile Organics Data for On-Site Soil 0-14 Feet Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-SS-SM	-1	GL-SS-SM	1-2	GL-SS-S	M-3	GL-95-5N	1-4	GL SS SM-S	5	GL:SS-SM-5 D	יוטפ	GL-SS-SN	4.5	GL-SS-SI	A:6	GL 55 SN	d 6	GL SS SM
Sample Depth	5'-7'		3'₌5'		5'-7'		5'-7'		5'₌7'		5'-7'		11'-13'		5'-7'		11'-13'	,	3'-5'
Semivolatile Organics	-	-																	
Phenol	1600	1	21000	1	4000	- 1	49000	В	26000		50000	1	64000		65000		67000		130000
bis(2-Chloroethyl) ether	4700	ύ	79000	ύ	1100	ύ	260000	Ü	31000	ΰ	76000	Ú	13000	U	14000	U	14000	U	160000
2-Chlorophenol	4700	Ū	79000	Ū	1100	UJ	260000	Ū	31000	U	76000	Ü	13000	Ü	14000	Ü	14000	Ü	160000
1,3-Dichlorobenzene	4700	Ü	79000	Ū	1100	ΰ	260000	Ū	31000	Ü	76000	ΰ	13000	ΰ	14000	Ü	14000	Ü	160000
1,4-Dichlorobenzene	490	ī	79000	Ü	1100	Ū	260000	Ū	31000	Ü	76000	Ŭ	13000	Ü	14000	บ	14000	Ü	160000
1,2-Dichlorobenzene	1300	í	79000	Ü	140	Ĭ	260000	Ū	31000	Ū	15000	Ī	13000	Ü	14000	Ü	14000	Ü	31000
2 Methylphenol	4700	Ú	79000	U	130	í	260000	Ū	31000	Ū	76000	Ú	13000	Ū	14000	Ü	14000	Ü	160000
2,2' Oxybis(1-Chloropropane)	4700	U	79000	Ū	1100	Ú	260000	Ū	31000	Ü	76000	Ü	13000	Ü	14000	Ü	14000	IJ	160000
4 Methylphenol	4700	U	79000	U	2000	ī	2600000	Ü	31000	Ü	76000	Ü	13000	Ü	14000	Ü	14000	Ü	160000
N Nitrosodi n propylamine	4700	Ü	79000	Ü	1100	ύ	260000	Ū	31000	Ü	76000	Ü	13000	Ü	14000	Ü	14000	Ü	160000
Hexachloroethane	4700	U	79000	Ü	1100	Ū	2600000	Ū	31000	Ū	76000	Ü	13000	Ü	14(XX)	Ü	14000	Ü	160000
Nitrobenzene	4700	Ū	79000	Ū	1100	Ū	260000	Ū	31000	Ü	76000	Ü	13000	Ü	14000	Ü	14(XX)	Ü	160000
Isophorone	4700	Ū	79000	U	1100	Ū	260000	Ū	31000	U	76000	Ü	13000	Ü	14000	Ü	14000	Ü	160000
2 Nitrophenol	4700	U	79000	U	1100	UJ	260000	Ū	31000	U	76000	Ü	13000	Ū	14000	Ü	14000	Ü	160000
2,4 Dimethylphenol	4700	U	79000	U	180	1	260000	Ū	31000	U	76000	Ü	13000	Ū	14000	Ü	14000	Ü	160000
bis(2-Chloroethoxy)methane	4700	U	79000	U	1100	ΰ	260000	U	31000	U	76000	U	13000	Ü	14000	Ü	140XX)	U	160000
2,4 Dichlorophenol	47(X)	U	79000	U	1100	ÜĮ	260000	U	31000	U	76000	U	13000	Ü	14000	Ü	14000	Ü	160000
1,2,4 Tru hlorobenzene	1500	1	79000	U	190	í	260000	Ü	31000	U	76000	Ü	13000	Ü	14000	Ü	14000	IJ	42000
Naphthalene	770	i	8600	j	290	í	260000	U	6100	1	32000	ı	13000	Ü	14000	Ü	14000	IJ	160000
4 Chloroandine	4700	Ú	79000	Ú	1100	Ú	260000	υ	31000	ύ	76000	Ú	13000	Ü	14000	Ü	14000	Ü	160000
Hexachlorobutadiene	4700	U	79000	U	1100	U	260000	U	31000	U	76000	Ü	13000	Ū	14000	U	14000	U	160000
4 Chloro-3-methylphenol	4700	U	79000	U	1100	UJ	260000	U	31000	U	76000	Ü	13000	Ū	14000	Ū	14000	U	160000
2 Methylnaphthalene	930	1	79(XX)	U	300	í	260000	U	22000	1	78000	Ī	13000	Ū	14000	Ū	14000	U	18000
Hexachlorocyclopentadiene	23000	Ú	380000	U	5300	Ú	1300000	U	150000	Ú	370000	Ú	65000	Ū	66000	Ū	67000	U	780000
2,4,6-Trichlorophenol	47(X)	U	79000	U	1100	UJ	260000	U	31000	U	76000	Ū	13000	Ū	14000	Ū	14000	U	160000
2,4,5-Trichlorophenol	4700	Ū	79000	U	1100	Új	260000	Ū	31000	Ū	76000	Ū	13000	Ū	14000	Ũ	14000	U	160000
2 Chloronaphthalene	4700	Ū	79000	U	1100	ΰ	260000	Ū	31000	ΰ	76000	ΰ	13000	ΰ	14000	Ü	14000	U	160000
2-Nitroaniline	23000	U	380000	υ	5300	U	1300000	U	150000	U	370000	Ū	65000	U	66000	U	67000	U	780000
Dimethyl phthalate	4700	U	79000	U	1100	U	260000	U	31000	U	76000	U	13000	U	14000	U	14000	U	160000
Acenaphthylene	4700	U	79000	U	1100	υ	260000	υ	31000	U	76000	U	13000	U	14000	U	14000	U	160000
2,6 Dinitrotoluene	4700	U	79000	U	1100	U	260000	U	31000	υ	76000	U	13000	U	14000	υ	14000	U	160000
3 Nitroaniline	23000	U	380000	U	5300	U	1300000	U	150000	U	370000	U	65000	υ	66000	U	67000	U	780000
Acenaphthene	4700	IJ	79000	U	1100	U	260000	U	31000	U	76000	IJ	13000	U	14000	U	14000	IJ	160000
2,4-Dinitrophenol	23000	υ	380000	U	5300	UJ	1300000	U	150000	U	370000	U	65000	U	66000	U	67000	U	780000
4-Nitrophenol	23000	U	380000	U	5300	υj	1300000	U	150000	U	370000	U	65000	U	66000	U	67000	U	780000
Dibenzofuran	4700	U	79000	U	1100	Ú	260000	U	31000	U	76000	υ	13000	U	14000	υ	14000	U	160000
2,4-Dinitrotoluene	4700	Ū	79000	U	1100	Ū	260000	Ū	31000	U	76000	Ū	13000	U	14000	U	14000	U	160000
Diethyl phthalate	4700	Ū	79000	U	1100	Ū	260000	U	31000	υ	76000	Ū	13000	U	14000	U	14000	υ	160000
4-Chlorophenyl phenyl ether	4700	Ū	79000	Ü	1100	Ū	260000	U	31000	U	76000	U	13000	U	14000	U	14000	U	160000
Fluorene	4700	Ū	79000	Ū	1100	Ū	260000	U	31000	Ū	76000	บ	13000	Ü	14000	U	14000	U	160000

Summary of Semivolatile Organics Data for On-Site Soil 0-14 Feel
Greiner's Lagoon Site, Fremont Ohio

Sample Depth Semivolatile Organics 4-Nitroaniline 230 4,6-Dinitro-2-methylphenol 230 N-Nitrosodiphenylamine 470		3'-5' 380000		5'-7'		5'-7'		5'-7'		~ -		111 101						_
4-Nitroaniline 230 4,6-Dinitro-2-methylphenol 230		380000						<i>.</i>		5'- <i>7</i> '		11'-13'		5'- <i>7</i> '		11'-13'		3'-5'
4,6-Dinitro-2-methylphenol 230		380000																
-,	00 U		U	5300	U	1300000	U	150000	U	370000	U	65000	U	66000	U	67000	U	780000
N-Nitrocodinhanylamine 470		380000	U	5300	UJ	1300000	U	150000	U	370000	U	65000	U	66000	U	67000	U	780000
tive introsourprienty in the control of the control	0 U	79000	U	1100	U	260000	U	31000	U	76000	U	13000	U	14000	U	14000	U	160000
4-Bromophenyl phenyl ether 470	0 U	79000	U	1100	U	260000	U	31000	U	76000	U	13000	U	14000	U	14000	U	160000
Hexachlorobenzene 470	o u	79000	U	1100	U	260000	U	31000	U	76000	U	13000	U	14000	U	14000	U	160000
Pentachlorophenol 230	00 U	380000	U	5300	UJ	1300000	U	150000	U	370000	U	65000	U	66000	U	67000	U	780000
Phenanthrene 52) j	79000	U	190	J	260000	U	4700	J	16000	J	13000	U	14000	U	14000	U	160000
Anthracene 470	o u	79000	U	1100	U	260000	U	31000	U	76000	U	13000	U	14000	U	14000	U	160000
Carbazole 470	0 U	79000	U	1100	U	260000	U	31000	U	76000	U	13000	U	14000	U	14000	U	160000
Di-n-butyl phthalate 470	o u	79000	U	1100	U	260000	U	31000	U	76000	U	13000	บ	14000	U	14000	U	160000
Fluoranthene 470	o U	79000	U	1100	U	260000	U	31000	U	76000	U	13000	U	14000	U	14000	U	160000
Pyrene 470	o u	79000	บ	120	J	260000	U	31000	υ	76000	υ	13000	บ	14000	U	14000	U	160000
Butyl benzyl phthalate 470	0 U	79000	U	1100	U	260000	U	31000	U	76000	U	13000	U	14000	U	14000	U	160000
3,3'-Dichlorobenzidine 230	00 U	380000	U	5300	U	1300000	U	150000	υ	370000	U	65000	U	66000	U	67000	U	780000
Benzo(a)anthracene 470	o u	79000	U	1100	U	260000	U	31000	U	76000	U	13000	U	14000	U	14000	Ū	160000
Chrysene 470	o U	79000	U	1100	U	260000	U	31000	U	76000	U	13000	U	14000	U	14000	U	160000
bis(2-Ethylhexyl) phthalate 290	00	550000		4900		1300000		21000	J	64000	J	13000	U	33000		14000	U	720000
Di-n-octyl phthalate 470	0 U	79000	U	1100	U	260000	U	31000	U	76000	U	13000	U	14000	U	14000	U	160000
Benzo(b)fluoranthene 470	0 U	79000	U	1100	U	260000	U	31000	U	76000	U	13000	U	14000	U	14000	U	160000
Benzo(k)fluoranthene 470	0 U	79000	U	1100	U	260000	U	31000	ប	76000	U	13000	U	14000	U	14000	U	160000
Benzo(a)pyrene 470	0 U	79000	U	1100	U	260000	U	31000	U	76000	U	13000	U	14000	U	14000	U	160000
Indeno(1,2,3-cd)pyrene 470	0 U	79000	U	1100	U	260000	U	31000	U	76000	U	13000	U	14000	U	14000	U	160000
Dibenz(a,h)anthracene 470	o u	79000	U	1100	U	260000	U	31000	U	76000	U	13000	U	14000	U	14000	U	160000
Benzo(ghi)perylene 470	o u	79000	U	1100	U	260000	U	31000	U	76000	U	13000	U	14000	U	14000	U	160000

All results are reported in units of ug/kg.

DUP = Duplicate sample

Blank spaces indicate that a constituent was not analyzed for in a given sample.

U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

Inble A-2 (Con't)
Summary of Semivolatile Organics Data for On-Site Soil 0-14 Feet
Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL:SS-SM	1.7	GL-SS-SM	-7	GL-56-5M-7	DUP	GI _A SS-SM	1-8	GL-88-SM	-8	GL-SS-SM	1-8	GL-SS-SN	1-8	G1, 88-81	VI-9	GL 88-81	M.9
Sample Depth	7'-9'		11'-13'		11'-13'		0'-1'		3'-5'		7'-9'		11'-13'		4'-6'		6' 8'	
Semivolatile Organics			-															
Phenol	45000		540	1	5500	j	430000	j	330000	1	250000	В	53000		400	IJ	410	ι
bis(2-Chloroethyl) ether	82(X)	U	400	Ù	810	Ú	560000	Ú	390000	Ú	390000	U	400	U	400	u	410	1
2-Chlorophenol	8200	u	400	U	810	U	560000	U	390000	U	390000	U	130	J	400	U	410	
1,3-Dichlorobenzene	8200	U	400	U	810	U	560000	U	390000	U	390000	U	400	Ü	400	u	410	
1,4-Dichlorobenzene	8200	u	400	U	810	υ	91000	J	390000	U	390000	U	400	U	400	U	410	
1,2-Dichlorobenzene	8200	U	400	υ	810	U'	230000	j	390000	U	390000	U	52	j	400	U	410	
2 Methylphenol	1900	J	400	U	810	U	560000	Ú	390000	U	390000	U	540		400	U	410	
2,2' Oxybis(1 Chloropropane)	82(X)	Ù	400	U	810	U	560000	U	390000	U	390000	IJ	400	υ	400	U	410	
1 Methylphenol	1400	J	400	U	810	U	560000	U	390000	U	390000	U	460		4(X)	IJ	410	
N-Nitrosodi n-propylamine	8200	Ú	400	U	810	U	560000	U	390000	U	390000	U	400	U	4(X)	U	410	1
lexachloroethane	8200	u	400	U	810	U	560000	υ	390000	U	390000	U	400	U	4(X)	U	410	
Nitrobenzene	8200	IJ	400	υ	810	U	560000	U	390000	υ	390000	U	4(X)	U	400	U	410	
hophorone	8200	U	400	U	810	U	560000	υ	390000	U	390000	IJ	48	J	4(X)	U	760	
2 Nitrophenol	8200	U	400	U	810	U	560000	U	390000	U	390000	U	400	Ú	400	U	410	
2,4 Dimethylphenol	1200	1	400	U	810	U	560000	U	390000	U	390000	U	400	IJ	400	U	410	
bis(2 Chloroethoxy)methane	8200	Ú	400	U	810	U	560000	U	390000	U	390000	υ	400	IJ	400	U	410	
2,4 Dichlorophenol	8200	U	400	υ	810	U	560000	υ	390000	υ	390000	U	400	U	4(X)	U	410	
1,2,4 Trichlorobenzene	8200	U	400	U	810	U	350000	1	390000	U	390000	IJ	60	1	400	U	410	
Naphthalene	8200	U	400	υ	810	U	86000	j	390000	U	390000	U	400	Ü	400	U	410	
4 Chloroandine	8200	U	400	υ	810	U	560000	Ú	390000	U	390000	U	400	U	400	U	410	
Hexachlorobutadiene	8200	U	400	U	810	U	560000	U	390000	U	390000	U	400	U	400	U	410	
4-Chloro-3-methylphenol	8200	U	400	U	810	U	560000	U	390000	U	390000	U	4(X)	U	400	U	410	
2 Methylnaphthalene	8200	U	400	U	810	U	130000	1	390000	U	390000	U	400	U	400	U	410	
Hexachlorocyclopentadiene	40000	U	1900	U	3900	U	2700000	ΰ	1900000	U	1900000	U	1900	U	2000	U	2000	
2,4,6-Trichlorophenol	8200	U	400	U	810	U	560000	U	390000	U	390000	U	400	U	4(X)	U	410	
2,4,5-Trichlorophenol	8200	U	400	U	810	U	560000	υ	390000	U	390000	U	400	U	400	U	410	
2 Chloronaphthalene	8200	U	400	U	810	U	560000	U	390000	U	390000	U	400	U	400	U	410	
2-Nitrouniline	40000	. บ	1900	U	3900	U	2700000	υ	1900000	U	1900000	U	1900	U	2000	U	2000	
Dimethyl phthalate	8200	U	400	U	810	U	560000	U	390000	U	390000	υ	400	U	4(X)	U	410	
Acenaphthylene	8200	U	400	U	810	บ	560000	U	390000	U	390000	U	400	U	400	U	410	
2,6-Dinitrotoluene	8200	U	400	U	810	υ	560000	U	390000	U	390000	U	400	U	400	U	410	
3 Nitroaniline	40000	U	1900	U	3900	U	2700000	υ	1900000	υ	1900000	υ	1900	U	2(XX)	U	2000	
Acenaphthene	8200	U	400	U	810	U	560000	U	390000	U	390000	U	400	U	400	U	410	
2,4-Dinitrophenol	40000	Ü	1900	U	3900	U	2700000	υ	1900000	υ	1900000	U	1900	U	2000	U	2000	
4-Nitrophenol	40000	Ū	1900	Ū	3900	Ū	2700000	υ	1900000	U	1900000	U	1900	U	2000	υ	2000	
Dibenzofuran	8200	Ū	400	Ū	810	U	560000	υ	390000	U	390000	U	400	U	400	U	410	
2.4-Dinitrotoluene	8200	Ū	400	Ū	810	Ū	560000	Ū	390000	U	390000	U	400	U	400	U	410	
Diethyl phthalate	8200	Ū	400	Ū	810	Ü	560000	U	390000	U	390000	U	400	υ	400	U	410	
4-Chlorophenyl phenyl ether	8200	U	400	Ü	810	Ū	560000	Ū	390000	Ū	390000	U	400	U	400	U	410	
Fluorene	8200	บ	400	Ü	810	Ü	560000	Ü	390000	Ū	390000	Ü	400	Ū	400	U	410	

Summary of Semivolatile Organics Data for On-Site Soil 0-14 Feed Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-SS-SN	A-7	GL-SS-SN	1-7	GL-SS-SM-7	DUP	GL-SS-SM	-8	GL-SS-SM	-8	GL-SS-SM	I-8 .	GL-SS-SN	<i>I</i> -8	GL-SS-SI	1 -9	GL-SS-SI	M-9
Sample Depth	7'-9'		11'-13'	,	11'-13'		0'-1'		3'-5'		7'-9'		11'-13'	ı	4'-6'		6'-8'	
Semivolatile Organics								-										
4-Nitroaniline	40000	U	1900	U	3900	บ	2700000	U	1900000	U	1900000	U	1900	U	2000	U	2000	ប
4,6-Dinitro-2-methylphenol	40000	U	1900	U	3900	U	2700000	U	1900000	U	1900000	U	1900	U	2000	U	2000	U
N-Nitrosodiphenylamine	8200	U	400	U	810	U	560000	U	390000	U	390000	U	400	U	400	U	410	υ
4-Bromophenyl phenyl ether	8200	U	400	U	810	U	560000	U	390000	U	390000	U	400	U	400	U	410	U
Hexachlorobenzene	8200	U	400	U	810	U	560000	U	390000	U	390000	U	400	U	400	U	410	U
Pentachlorophenol	40000	U	1900	U	3900	u'	2700000	U	1900000	U	1900000	U	1900	U	2000	U	2000	U
Phenanthrene	8200	U	400	U	810	U	560000	U	390000	บ	390000	U	400	U	400	U	410	บ
Anthracene	8200	U	400	U	810	U	560000	U	390000	U	390000	U	400	U	400	U	410	U
Carbazole	8200	U	400	U	810	U	560000	U	390000	U	390000	U	400	U	400	U	410	U
Di-n-butyl phthalate	8200	U	400	U	810	U	560000	U	390000	U	390000	U	400	U	400	U	410	U
Fluoranthene	8200	U	400	U	810	U	560000	U	390000	U	390000	U	400	U	400	U	410	U
Pyrene	8200	U	400	U	810	U	560000	U	390000	U	390000	U	400	U	400	U	410	U
Butyl benzyl phthalate	8200	U	400	U	810	ប	560000	U	390000	U	390000	U	400	U	400	U	410	U
3,3'-Dichlorobenzidine	40000	U	1900	U	3900	ប	2700000	U	1900000	U	1900000	ប	1900	U	2000	U	2000	U
Benzo(a)anthracene	8200	υ	400	U	810	U	560000	U	390000	U	390000	U	400	U	400	U	410	U
Chrysene [*]	8200	U	400	U	810	U	560000	U	390000	U	390000	U	400	U	400	U	410	υ
bis(2-Ethylhexyl) phthalate	8200	U	1900		1500		4000000		2700000		2300000		2500	J	1000		480	
Di-n-octyl phthalate	8200	U	400	U	810	U	560000	U	390,000	U	390000	U	400	υ	400	U	410	U
Benzo(b)fluoranthene	8200	U	400	U	810	U	560000	U	390000	U	390000	U	400	U	400	U	410	U
Benzo(k)fluoranthene .	8200	U	400	U	810	U	560000	υ	390000	U	390000	U	400	U	400	U	410	U
Benzo(a)pyrene	8200	U	400	U	810	U	560000	U	390000	U	390000	บ	400	U	400	U	410	U
Indeno(1,2,3-cd)pyrene	8200	U	400	U	810	U	560000	U	390000	U	390000	U	400	U	400	U	410	U
Dibenz(a,h)anthracene	8200	U	400	U	810	U	560000	U	390000	U	390000	U	400	U	400	U	410	U
Benzo(ghi)perylene	8200	U	400	U	810	บ	560000	U	390000	U	390000	U	400	U	400	U	410	U

All results are reported in units of ug/kg.

DUP = Duplicate sample

Blank spaces indicate that a constituent was not analyzed for in a given sample.

Summary of Semivolatile Organics Data for On-Site Soil 0-14 Feet Greiner's Laguon Site, Fremont Ohio

Sample Location	GL-SS-SN	1-9	GL-SS-SM	1-10	GL-SS-SN	4-10	GL SS-SM	1-10	GL-98-9	8	GL-SS-SI	3-1	GLSS-S	B-2	GL-SS-S	B-3	GL/SS-S	8-4
Sample Depth	12'-14'	ı	4'-6'		6'-8'		12'-14'	1	0'-1'		6-8		6-8		6-8		8-10	
Semivolatile Organics																		
Phenol	410	U	410	U	390	U	420	U	170000	U	1400		6100		390	U	52000	
bis(2-Chloroethyl) ether	410	U	410	U	390	U	420	U	170000	υ			_			•		
2 Chlorophenol	410	U	410	υ	390	U	420	U	170000	Ū								
1,3-Dichlorobenzene	410	U	410	U	390	U	420	U	170000	Ū								
1,4-Dichlorobenzene	410	U	410	U	390	U	420	U	170000	U	400	U	810	U	390	U	8100	U
1,2-Dichlorobenzene	410	U	410	U	390	U	420	U	170000	U	400	U	810	U	390	Ü	8100	Ü
2-Methylphenol	410	U	410	U	390	U	420	U	170000	U	40	j	810	U	390	Ū	8100	Ü
2,2'-Oxybis(1-Chloropropane)	410	U	410	υ	390	U	420	U	170000	U		•						_
4 Methylphenol	410	U	410	U	390	U	420	U	170000	U	170	1	810	U	390	U	8100	U
N Nitrosodi n propylamine	410	U	410	υ	390	U	420	U	170000	U		•				•••		-
Hexachloroethane	410	U	410	U	390	U	420	U	170000	Ū								
Nitrobenzene	410	U	410	U	390	U	420	U	170000	U								
Inophorone	410	U	410	U	390	U	420	U	170000	Ū	400	U	810	U	390	U	8100	IJ
2 Nitrophenol	410	υ	410	U	390	U	420	υ	170000	Ü			-	-		-		-
2,4 Dimethylphenol	410	U	410	U	390	U	420	U	170000	Ũ	400	U	810	υ	390	U	8100	U
bis(2-Chloroethoxy)methane	410	υ	410	U	390	U	420	U	170000	Ū		_		_		_		_
2,4 Dichlorophenol	410	Ū	410	U	390	U	420	υ	170000	U								
1,2,4-Trichlorobenzene	410	υ	410	U	390	Ū	420	υ	170000	U	400	U	810	U	390	U	8100	U
Naphthalene	410	U	410	U	390	U	420	U	170000	U	400	U	810	υ	390	Ū	8100	U
4 Chloroaniline	410	υ	410	U	390	U	420	υ	170000	υ								
Hexachlorobutadiene	410	Ū	410	Ū	390	Ü	420	υ	170000	U								
4-Chloro 3-methylphenol	410	υ	410	U	390	U	420	U	170000	U								
2 Methylnaphthalene	410	U	410	U	390	U	420	U	170000	U	400	U	810	U	390	U	8100	U
Hexachlorocyclopentadiene	2000	υ	2000	U	1900	U	2000	U	800000	U								
2,4,6-Trichlorophenol	410	U	410	U	390	U	420	U	170000	U								
2,4,5-Trichlorophenol	410	U	410	U	390	U	420	U	170000	U								
2-Chloronaphthalene	410	U	410	U	390	U	420	U	170000	U								
2-Nitronniline	2000	U	2000	U	1900	U	2000	U	800000	U								
Dimethyl phthalate	410	U	410	U	390	U	420	บ	170000	U								
Acenuphthylene	410	U	410	U	390	U	420	Ū	170000	Ū								
2,6-Dinitrotoluene	410	U	410	Ū	390	Ū	420	U	170000	U								
3-Nitroaniline	2000	Ū	2000	U	1900	U	2000	Ū	800000	Ū								
Acenaphthene	410	Ü	410	U	390	Ū	420	U	170000	Ū								
2,4-Dinitrophenol	2000	U	2000	U	1900	U	2000	U	800000	U								
4-Nitrophenol	2000	Ū	2000	U	1900	U	2000	Ü	800000	U								
Dibenzofuran	410	U	410	U	390	U	420	U	170000	U								
2,4-Dinitrotoluene	410	Ū	410	Ū	390	U	420	U	170000	Ū								
Diethyl phthalate	410	Ū	410	Ū	390	Ū	420	Ū	170000	Ū								
4-Chlorophenyl phenyl ether	410	Ū	410	Ū	390	Ū	420	Ū	170000	Ū								
Fluorene	410	Ü	410	Ū	390	Ū	420	Ū	170000	Ū								

Summary of Semivolatile Organics Data for On-Site Soil 0-14 Feet
Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-SS-SN	1-9	GL-SS-SM	1-10	GL-SS-SM	I-10	GL-SS-SM	l-10	GL-SS-S	s	GL-SS-SI	B-1	GL-SS-S	B-2	GL-SS-S	B-3	GL-SS-S	B-4
Sample Depth	12'-14'	1	4'-6'		6'-8'		12'-14'	1	0'-1'		6-8		6-8		6-8		8-10	1
Semivolatile Organics																		
4-Nitroaniline	2000	U	2000	U	1900	U	2000	U	800000	U								
4,6-Dinitro-2-methylphenol	2000	U	2000	U	1900	U	2000	U	800000	U								
N-Nitrosodiphenylamine	410	U	410	U	390	U	420	U	170000	U								
4-Bromophenyl phenyl ether	410	U	410	U	390	U	420	U	170000	U								
Hexachlorobenzene	410	U	410	U	390	U	420	U	170000	U								
Pentachlorophenol	2000	U	2000	U	1900	U	2000	U	800000	U								
Phenanthrene	410	U	410	U	390	U	420	U	170000	U	400	U	810	U	390	U	8100	U
Anthracene	410	U	410	U	390	U	420	U	170000	U								
Carbazole ,	410	U	410	U	390	U	420	U	170000	U								
Di-n-butyl phthalate	410	U	410	U	390	U	420	U	36000	j	400	U	810	บ	390	υ	8100	U
Fluoranthene	410	U	410	U	390	U	420	U	170000	Ü								
Pyrene	410	U	410	U	390	U	420	U	170000	U								
Butyl benzyl phthalate	410	U	410	U	390	U	420	U	172000	J	400	U	810	U	390	U	8100	U
3,3'-Dichlorobenzidine	2000	U	2000	U	1900	U	2000	U	800000	Ü								
Benzo(a)anthracene	410	U	410	U	390	U	420	U	170000	U								
Chrysene	410	U	410	U	390	U	420	U	170000	U								
bis(2-Ethylhexyl) phthalate	350	Ī	1100		1400		460		870000		400	U	810	บ	40	J	8100	U
Di-n-octyl phthalate	410	Ū	410	υ	390	U	420	U	170000	U								
Benzo(b)fluoranthene	410	U	410	U	390	U	420	U	170000	U								
Benzo(k)fluoranthene	410	บ	410	บ	390	บ	420	U	170000	U								
Benzo(a)pyrene	410	υ	410	U	390	U	420	U	170000	U								
Indeno(1,2,3-cd)pyrene	410	บ	410	บ	390	U	420	U	170000	U								
Dibenz(a,h)anthracene	410	Ū	410	U	390	U	420	U	170000	บ								
Benzo(ghi)perylene	410	Ū	410	บ	390	U	420	U	170000	U								

All results are reported in units of ug/kg.

DUP = Duplicate sample

Blank spaces indicate that a constituent was not analyzed for in a given sample.

U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

Tuble A-2 (Con 1)
Summary of Semivolatile Organics Data for On-Site Soil 0-14 Feet
Greiner's Lagoon Site, Fremont Ohio

Fluorene

Sample Location		บเก	GL/SS/SB-5 (M	W-2)	GL-88-SE	} -6	GL-88-8	B-7	G1/88-9	SB-8	GL-88-8	3.9	GL/88-81	- 10	GL-88-88	F11	GL-SS-SB-	12
Sample Depth	8-10		6-8		4-6		6-8		4-6	5	4-6		6-8		0-2		6-8	-
Semivolatile Organics																		
Phenol	63000		410	U	380	U	400	U	400	Uj	400	U	130	1	170000	U	26000	
bis(2-Chloroethyl) ether										-,	****	_	•••	,		•		
2 Chlorophenol																		
1,3-Dichlorobenzene																		
1,4-Dichlorobenzene	10000	U	410	U	380	U	400	υ	400	UJ	400	U	400	υ	170000	U	400	ı
1,2-Dichlorobenzene	10000	U	410	υ	380 ¹	U	400	U	400	Ú	400	U	400	Ū	39000	j	400	i
2-Methylphenol	10000	U	410	U	380	U	400	U	400	υj	400	U	400	U	170000	Ú	630	
2,2' Oxybis(1 Chloropropine)										•		•				_		
4 Methylphenol	10000	U	410	υ	380	U	400	υ	400	UJ	400	U	400	υ	17(KXX)	U	310	
N-Nitrosodi-n propylamine										•						_		
Hexachloroethane																		
Nitrobenzene																		
Isophorone	10000	U	76	1	100	1	400	U	400	UJ	400	U	400	U	170000	U	400	ι
2 Nitrophenol				•		•			-			-				_	•	
2,4-Dimethylphenol	10000	U	410	U	380	U	400	υ	400	UJ	400	U	400	υ	170000	U	400	t
bis(2-Chloroethoxy)methane										-,		-		_		_		
2,4 Dichlorophenol																		
1,2,4 Trichlorobenzene	10000	υ	410	U	380	U	400	υ	400	UJ	400	U	400	U	58000	1	400	ι
Naphthalene	10000	U	410	U	380	U	400	U	4(X)	υj	4(X)	Ū	400	Ü	26000	í	400	ι
4-Chloroaniline										•				_		,		
Hexachlorobutadiene			•															
4-Chloro-3-methylphenol																		
2 Methylnophthalene	10000	U	410	U	380	U	400	U	400	UJ	400	U	400	Ų	26000	1	400	ι
Hexachlorocyclopentadiene										•						•		
2,4,6-Trichlorophenol				•														
2,4,5-Trichlorophenol																		
2-Chloronaphthalene																		
2-Nitrouniline																		
Dimethyl phthalate																		
Acenaphthylene																		
2,6-Dinitrotoluene																		
3-Nitroaniline																		
Acenaphthene																		
2,4-Dinitrophenol																		
4-Nitrophenol																		
Dibenzofuran																		
2,4-Dinitrotoluene																		
Diethyl phthalate																		
4-Chlorophenyl phenyl ether																		
El																		

Table A-2 (Con't) Summary of Semivolatile Organics Data for On-Site Soil 0-14 Feet Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-SS-SB-4 DU	P GI	L-SS-SB-5 (M	W-2)	GL-SS-SI	3-6	GL-SS-SE	- 7	GL-SS-S	SB-8	GL-SS-SI	3-9	GL-SS-SB	-10	GL-SS-SE	-11	GL-SS-SB-1	12
Sample Depth	8-10		6-8		4-6		6-8		4-6		4-6		6-8		0-2		6-8	
Semivolatile Organics																		_
4-Nitroaniline																		
4,6-Dinitro-2-methylphenol																		
N-Nitrosodiphenylamine																		
4-Bromophenyl phenyl ether																		
Hexachlorobenzene					1													
Pentachlorophenol					1													
Phenanthrene	10000	U	410	U	380	U	400	U	400	UJ	400	U	400	U	170000	U	400	1
Anthracene																		
Carbazole																		
Di-n-butyl phthalate	10000	U	410	U	380	U	400	U	400	UJ	400	U	400	U	170000	U	400	I
Fluoranthene																		
Pyrene																		
Butyl benzyl phthalate	10000	U	410	U	380	บ	400	U	400	UJ	400	U	400	U	170000	UJ	400	Į
3,3'-Dichlorobenzidine																		
Benzo(a)anthracene								•										
Chrysene																		
bis(2-Ethylhexyl) phthalate	10000	U	1600		380	U	850	J	270	J	400	U	370	J	510000	J	120	
Di-n-octyl phthalate																		
Benzo(b)fluoranthene																		
Benzo(k)fluoranthene																		
Benzo(a)pyrene																		
Indeno(1,2,3-cd)pyrene																		
Dibenz(a,h)anthracene											•							
Benzo(ghi)perylene																		

All results are reported in units of ug/kg.

DUP = Duplicate sample

Blank spaces indicate that a constituent was not analyzed for in a given sample.

U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

l'able A-2 (Con't)
Summary of Semivolatile Organics Data for On-Site Soil 0-14 Feet
Greiner's Lagoon Site, Fremont Ohio

Sample Location	GU-SS-SE	-13	GL/SS-SB-13	DUP	MW-13	}
Sample Depth	6-8		6-8		8-10	
Semivolatile Organics						
Phenol	390	U	400	υ	460	υ
his(2-Chloroethyl) ether						
2-Chlorophenol					460	υ
1,3-Dichlorobenzene						
1,4-Dichlorobenzene	390	U	400	U	460	U
1,2-Dichlorobenzene	390	U	400	υ	460	ט'
2-Methylphenol	390	U	400	U	460	U
2,2' Oxybis(1-Chloropropane)						
4 Methylphenol	390	U	400	U	460	U
N-Nitrogodi-n-propylamine					460	U
Hexachloroethane						
Nitrobenzene						
Isophorone	390	U	400	U	460	U
2 Nitrophenol						
2,4 Dinwthylphenol	390	U	400	บ		
bis(2-Chloroethoxy)methane						
2,4 Dichlorophenol						
1,2,4 Trichlorobenzene	390	U	400	บ	460	U
Naphthalene	390	U	400	U	460	U
4-Chloroaniline						
Hexachlorobutadiene						
4-Chloro-3-methylphenol					460	U
2-Methylnaphthalene	390	U	400	U	460	U
Hexachlorocyclopentadiene						
2,4,6-Trichlorophenol						
2,4,5-Trichlorophenol						
2-Chloronaphthalene						
2-Nitroaniline						
Dimethyl phthalate						
Acenaphthylene						
2,6-Dinitrotoluene						
3-Nitroaniline						
Acenaphthene		:			460	U
2,4-Dinitrophenol						
4-Nitrophenol					2300	U
Dibenzofuran						
2,4-Dinitrotoluene					460	U
Diethyl phthalate						
4-Chlorophenyl phenyl ether						
Fluorene						

Table A-2 (Con't)
Summary of Semivolatile Organics Data for On-Site Soil 0-14 Feet
Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-SS-SE	-13	GL-SS-SB-13	DUP	MW-1	3
Sample Depth	6-8		6-8		8-10'	
Semivolatile Organics						
4-Nitroaniline						
4,6-Dinitro-2-methylphenol						
N-Nitrosodiphenylamine						
4-Bromophenyl phenyl ether						
Hexachlorobenzene						
Pentachlorophenol					460	ប់
Phenanthrene	390	U	400	U		
Anthracene						
Carbazole						
Di-n-butyl phthalate	390	U	400	U ·		
Fluoranthene					460	U
Pyrene					460	U
Butyl benzyl phthalate	390	U	400	U		
3,3'-Dichlorobenzidine						
Benzo(a)anthracene						
Chrysene						
bis(2-Ethylhexyl) phthalate	160	J	61	J	460	U
Di-n-octyl phthalate						
Benzo(b)fluoranthene						
Benzo(k)fluoranthene						
Benzo(a)pyrene						
Indeno(1,2,3-cd)pyrene			•			
Dibenz(a,h)anthracene						
Benzo(ghi)perylene						

All results are reported in units of ug/kg.

DUP = Duplicate sample

Blank spaces indicate that a constituent was not analyzed for in a given sample.

Summary of Pesticide/PCB Data for On-Site Soil 0-14 Feet Greiner's Lagoon Site, Fremont Ohio

Sample Location			GL-SS-SM-	5-6	GL-SS-SM	-7-8	GL-SS-SM-7-8 GL-SS-SM-8			GL-SS-SM	.9-10	GL-SS-SM-	9-10	CL SS SM	1-9-10			
Sample Depth	5'-7'		5'-7'		11'-13'		3'-5'		7'-9'		0'-1'		4'-6'		6'-8'		12'-14	ľ
Penticide/PCB												-			• • • • • • • • • • • • • • • • • • • •			
alpha-BHC	25	UJ	410	U	20	U	410	U	400	U	2000	U	2	U	21	U	13	t,
ruta BHC	25	UJ	410	υ	20	U	410	U	400	U	2000	U	2	U	21	U	13	U
lelta BHC	25	UJ	410	U	20	U	410	U	400	U	2000	U	2	U	21	U	13	u
gamma-BHC (Lindane)	25	UJ	410	U	20	U	410	U	400	U	2000	υ	2	U	21	U	13	L.
Heptachlor	25	UJ	410	U	20	U	410	U	400	U	2000	υ	2	U	21	U	13	U
Aldrin	25	UJ	410	U	20	U	410	U	400	U	2000	U	2	U	21	U	13	U
Teptachlor epoxide	25	UJ	410	υ	20	U	410	U	400	U	2000	U	2	U	21	U	13	U
Indosulfan 1	25	່ປຸ	410	บ	20	U	410	U	400	υ	2000	U	2	U	21	IJ	13	U
Dieldrin	51	UJ	820	U	40	U	820	U	790	U	4000	U	4	U	41	U	25	U
I,4'-DDE	51	UJ	820	U	40	U	820	U	790	U	4000	U	4	U	41	U	25	U
Endrin	51	UJ	820	U	40	U	820	U	790	U	4000	U	4	U	41	U	25	U
Indosulfan II	51	UJ	820	U	40	U	820	U	790	U	4000	U	4	U	41	U	25	U
,4'-DDD	51	UJ	820	U	40	U	820	U	790	υ	4000	U	4	U	41	U	25	υ
Endosulfan sulfate	51	UJ	820	U	40	U	820	U	790	U	4000	U	4	U	41	U	25	t.
,4'-DDT	51	UJ	820	U	40	U	820	U	790	U	4000	U	4	U	41	IJ	25	τ
Methoxychlor	250	UJ	4100	U	200	U	4100	U	4000	U	20000	U	20	U	210	U	130	t,
Endrin ketone	51	UJ	820	U	40	U	820	U	630	j	4000	U	4	U	41	U	25	t
Endrin aldehyde	51	UJ	820	U	40	U	820	U	790	U	4000	U	4	U	41	U	25	ι
ilpha-Chlordane	25	UJ	410	U	20	U	410	U	400	U	2000	U	2	U	21	U	13	ι
gamma-Chlo <mark>rdane</mark>	25	UJ	410	U	20	U	410	U	400	U	2000	U	2	U	21	U	13	ι
Toxaphene	1300	UJ	20000	U	1000	U	20000	U	20000	υ	100000	U	100	U	1000	U	630	τ
Aroclor 1016	250	UJ	4100	U	200	U	4100	U	4000	U	20000	U	40	U	210	υ	130	ι
Aroclor 1221	250	UJ	4100	U	200	U	4100	U	4000	U	20000	U	40	U	210	U	130	ι
Aroclor 1232	250	UJ	4100	U	200	U	4100	U	4000	U	20000	U	40	U	210	U	130	ι
Aroclor 1242	250	UJ	4100	U	200	U	4100	U	4000	U	20000	U	40	U	210	U	130	ι
Aroclor 1248	250	Uj	4100	U	200	U	4100	U	4000	U	20000	U	40	U	210	U	130	ι
Vroclor 1254	360	j	8200	U	400	U	8200	U	5800	J	40000	U	40	υ	410	U	250	t,
Aroclor 1260	510	ÚJ	8200	U	400	U	8200	U	7900	Ú	40000	U	40	U	410	U	250	ι

All results are reported in units of ug/kg.

DUP = Duplicate sample

Blank spaces indicate that a constituent was not analyzed for in a given sample.

Summary of Pesticide/PCB Data for On-Site Soil 0-14 Feet Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-SS-SS	3	GL-SS-SB	-1	GL-SS-SB-2	GL-SS-SB	-3 G1	L-SS-SB-4	GL-SS-SB-4 DU	P GL-SS-SB-5 (MW-2)	GL-SS-SB-6	GL-SS-SI	B-7
Sample Depth	0'-1'		6-8		6-8	6-8		8-10	8-10	6-8	4-6	6-8	
Pesticide/PCB												~ ~~~	
alpha-BHC	2100	U											
bela-BHC	2100	U											
delta-BHC	2100	U											
gamma-BHC (Lindane)	2100	U											
Heptachlor	2100	U				i							
Aldrin	2100	U											
Heptachlor epoxide	2100	U											
Endosulfan I	2100	U											
Dieldrin	4200	U											
4,4'-DDE	4200	U											
Endrin	4200	U											
Endosulfan II	4200	U			_								
4,4'-DDD	4200	U											
Endosulfan sulfate	4200	U											
4,4'-DDT	4200	U											
Methoxychlor	21000	ប											
Endrin ketone	4200	U											
Endrin aldehyde	4200	U											
alpha-Chlordane	2100	U											
gamma-Chlordane	2100	U											
Toxaphene	100000	U											
Aroclor 1016	21000	U			•								
Aroclor 1221	21000	U		-									
Aroclor 1232	21000	U											
Aroclor 1242	21000	Ū											
Aroclor 1248	21000	U											
Aroclor 1254	38000]	40	U	40 U	j 39	ប	41	J 40	U 41	J 38 U	40	J
Aroclor 1260	42000	Ú				-							

Notes:

All results are reported in units of ug/kg.

DUP = Duplicate sample

Blank spaces indicate that a constituent was not analyzed for in a given sample.

Summary of Pesticide/PCB Data for On-Site Soil 0-14 Feet Greiner's Lagoon Site, Fremont Ohio

Sample Location	CL-SS-SB-8	GL:	SS-SB-9	GL-59-5B-10	GL-5S-5B-11	GL-SS-SB-12	G	L-SS-SB-13	GL-SS-SB-1	3 DUP
Sample Depth	4-6		4-6	6-8	0-2	6-8		6-8	6-8	
l'esticide/l'CB				<u> </u>						
nlpha-BHC										
beta-BHC										
delta-BHC										
gamma-BHC (Lindane)										
Heptachlor					1					
Aldrin										
Heptachlor epoxide										
Endosulfan I										
Dieldrin										
4,4'-DDE										
Endrin										
Endosulfan II										
4,4'-DDD										
Endosulfan sulfate										
4,4'-DDT										
Methoxychlor							•			
Endrin ketone										
Endrin aldehyde										
alpha-Chlordane										
gamma-Chlordane										
Toxaphene										
Aroclor 1016				•						
Aroclor 1221										
Aroclor 1232										
Aroclor 1242										
Aroclor 1248										
Aroclor 1254	40	J 40) UJ	40	J 2.7	J 40	U	39 UJ	40	บ
Aroclor 1260			·					·		

All results are reported in units of ug/kg.

DUP = Duplicate sample

Blank spaces indicate that a constituent was not analyzed for in a given sample.

Summary of Metals Data for Soil 0-14 Feet Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-SS-SM-1-4 5'-7'		GL-SS-SM-5-6 5'-7'		GL-SS-SM-5-6 11'-13'		GL-SS-SN	<i>1</i> -7-8	GL-SS-SN	<i>1</i> -7-8	GL-SS-SM-8		GL-SS-SM-9-10		GL-SS-SM-9-10	
Sample Depth							3'-5'		7'-9'		0'-1'		4'-6'		6'-8'	
Metals				,												
Antimony	1.5	UJ	1.2	ប្យ	1.2	ប្យ	1.2	ប្យ	1.2	UJ	6.2	J	1.2	ບງ	1.2	ប្យ
Arsenic	5.8		11.7		6.4		5.8		9.5		7.1		4.5		6 .0	
Beryllium	0.77	ប្យ	0.61	ប្យ	0.61	ប្យ	0.61	ប្យ	0.59	ប្យ	0.61	UJ	0.6	ប្យ	0.62	ບງ
Cadmium	1.9		1.3		0.28		8.5		0.75		43.7		0.24	U	0.25	U
Chromium	12.3		9.0		6.9		21.9		6.8		94.6		6.2		6.0	
Copper	48.1	J	12.1	J	14.6	J	30.5	J	11.4	J	102	J	8.0	J	13.3	J
Lead	58.0	J	45.7	J	7.4	J	228	J	20.0	J	811	J	4.8	J	6.6	J
Mercury	0.15	U	0.12	U	0.12	U	0.33		0.12	U	1.3		0.12	U	0.12	U
Nickel	11.7	J	11.6	J	15.4	J	13.8	J	10.4	J	31.3	J	9.8	J	13.9	J
Selenium	0. <i>7</i> 7	UJ	0.61	ប្យ	0.61	ប្យ	0.61	IJ	0.59	UJ	3.4	J	0.6	UJ	0.62	UJ
Silver	0.77	U	0.61	U	0.61	U	0.61	U	0.59	U	0.61	U	0.6	U	0.62	U
Thallium	1.5	ប្យ	1.2	UJ	1.2	ប្យ	1.2	UJ	1.2	ប្យ	1.2	IJ	1.2	ហ្វ	1.2	IJ
Zinc	155	J	72.6	Ĵ	40.3	J	407		51.6	J	2470	J	30.3	J	33.2	J

All results are reported in units of mg/kg.

U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

Summary of Metals Data for Soil 0-14 Feet Greiner's Lagoon Site, Fremont Ohio

	Sample Location	GL-SS-SM	-9-10	GL-SS	-99	MW-13		
	Sample Depth	12'-14	•	0'-1	1	8-10	•	
Metals								
Antimony		1.5	UJ	1.3	U	1.2	UJ	
Arsenic		12.7		8.8		14.2	J	
Beryllium		0.75	UJ	0.63	U	0.6	U	
Cadmium		0.34		7.5		0.24	U,	
Chromium	1	16.8		22.7		13.7	J	
Copper		26.6	j	29.3		25.3		
Lend		12.6	j	98.0		10.3	J	
Mercury		0.15	Ü	0.33		0.12	U	
Nickel		31.4	j	18.6		26.6	J	
Selenium		0.75	ÚJ	0.63	UJ	0.6	ÚJ	
Silver		0.75	Ú	0.63	บ	0.6	U	
Thallium		1.5	UJ	1.3	υ	1.2	U	
Zinc		67.5	j	175		67.8		

All results are reported in units of mg/kg.

Summary of Volatile Organics Data for Off-Site Soil 0-14 Feet Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-SS-G	B-2	GL-SS-G	B-3	GL-SS-G	B-4	GL-SS-C	GB-5	GL-SS-G	B-7	GL-SS-G	B-11	GL-SS-G	B-14	GL-SS-G	B-15	GL-SS-G	B-15
Sample Depth	6-8'		8-10'		6-8'		6-8'		10-12'		6-8'		4-6'		4-6'		6-8'	
Volatile Organics																		
Acetone	12	J	11000	J	4000	J	14	J	2500	J	26	J	23	U	2 6	U	6500	
2-Butanone	23	U	6000	U	3100	U	25	U	250 ·	U	24	U	23	U	2 6	U	3800	
Benzene	5.8	U	1500	U	360	J	9		63	U	6	U	5.7	U	6.4	U	7 30	U
4-Methyl-2-pentanone	23	U	32000	J	11000	J	, 2 5	υ	680		24	U	23	U	26	U	2900	U
Toluene	5.8	U	1500	U	780	U	6.3	U	63	U	6	U	5.7	U	6.4	U	730	U
Ethylbenzene	5.8	U	1500	U	780	U	6.3	U	63	U	6	U	5.7	U	6.4	U	730	U
Xylenes (total)	5.8	U	1500	U	780	U.	6.3	U	63	U	6	บ	5.7	U	6.4	U	7 30	U

All results are reported in units of ug/kg.

U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

Table A-5 (Con't)
Summary of Volatile Organics Data for Off-Site Soil 0-14 Feet
Greiner's Lagoon Site, Fremont Ohio

Sample Location Sample Depth		3-15	GL-55-G 2-4'	B-17
Volatile Organics				
Acetone	28000		23	Ŭĵ
2-Butanone	3100	U	23	U
Benzene	<i>77</i> 0	U	5.8	ហ្វ
4-Methyl-2-pentanone	7800		23	Uj
Toluene	770	U	5.8	Uj
Ethylbenzene	<i>77</i> 0	υ	5.8	Új
Xylenes (total)	<i>77</i> ()	U	5.8	Új

All results are reported in units of ug/kg.

U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

Summary of Semivolatile Organics Data for Off-Site Soil 0-14 Feet Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-SS-C	GB-2	GL-SS-G	B-3	GL-SS-G	B-4	GL-SS-G	B-5	GL-SS-G	B-7	GL-SS-GI	3-11	GL-SS-G	B-14	GL-SS-GI	3-15	GL-SS-GB-1
Sample Depth	6-8'		8-10'		6-8'		6-8'		. 10-12	,	6-8'		4-6'		4-6'		6-8'
Semivolatile Organics																	
Phenol	380	UJ	47000		21000		410	U	420	U	400	U	380	U	420	U	27000
1,2-Dichlorobenzene	380	U	7900	U	4100	U	410	U	420	U	400	U	380	U	420	U	3800
2-Methylphenol	380	UJ	7900	U	1000	J	410	U	420	U	400	U	380	U	420	U	3800
4-Methylphenol	380	UJ	7900	U	590	įJ	410	U	420	U	400	U	380	U	420	U	3800
Isophorone	380	U	7900	U	4100	ับ	410	U	420	U	400	U	380	U	420	U	3800
1,2,4-Trichlorobenzene	380	U	7900	U	41000	U	410	U	420	U	400	U	380	U	420	U	3800
Naphthalene	7 6	J	7900	U	4100	U	410	U	420	U	400	U	380	U	420	U	3800
2-Methylnaphthalene	380	U	7900	U	4100	U	410	U	420	U	400	U	380	U	420 ·	U	3800
Fluoranthene	380	U	7900	U	4100	U	410	U	420	U	400	U	380	U	420	U	3800
bis(2-Ethylhexyl) phthalate	84	J	7900	U	4100	U	410	U	420	U	57	J	380	U	420	U	3800

All results are reported in units of ug/kg.
U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

Table A-6 (Con't)
Summary of Semivolatile Organics Data for Off-Site Soil 0-14 Feet
Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-SS-GB	-15	GL/SS-GI	3-17
Sample Depth	8-10		2-4'	
Semivolatile Organics				
Phenol	16000		390	U
1,2-Dichlorobenzene	2700	U	390	U
2-Methylphenol	2700	U	390	U
4-Methylphenol	2700	υ	390	υ
Isophorone	2700	U	390	U
1,2,4-Trichlorobenzene	27 00	U	390	U
Naphthalene	2700	U	390	U
2 Methylnaphthalene	2700	U	390	U
Fluoranthene	2700	U	390	U
bis(2 Ethylhexyl) phthalate	2700	U	390	U

All results are reported in units of ug/kg.

U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

Summary of Metals Data for Off-Site Soil 0-14 Feet Greiner's Lagoon Site, Freemenot Ohio

Sample Location	GL-SS-C	3B-1	GL-SS-0	GB-4	GL-SS-C	GB-6	GL-SS-C	B-8	GL-SS-G	B-10	GL-SS-G	B-12	GL-SS-G	B-13	GL-SS-G	B-15
Sample Depth	4-6'		6-8		2-4'		2-4'		6-8'		8-10'		4-6'		4-6'	
Metals			-				·									
Antimony	1.2	UJ	1.2	IJ	1.5	UJ	1.2	UJ	1.2	ប្យ	1.3	ប្យ	1.2	ប្យ	1.2	ប្យ
Arsenic	2.6	J	4.9	J	9.0	J	2.3	J	8.2	J	9.1	J	1.5	J	5.0	J
Beryllium	0.59	U	0.62	U	0.73	U	0.61	U	0.61	U	0.64	U	0.61	U	0.6	U
Cadmium	0.23	U	0.25	U	0.29	U	0.24	U	0.27		0.26	U	0.24	U	0.24	U
Chromium	5.2		17.4		10.9		12.1		12.5		14.1		4.0		8.4	
Copper	8.8		27.1		11.1		6.2		25.9		27.3		7.3		15.4	
Lead	5.0	J	12.3	J	13.5	J	6.5	J	13.5	J	13.1	J	4.1	J	8.6	J
Mercury	0.12	U	0.12	U	0.15	U	0.12	U	0.12	U	0.13	U	0.12	U	0.12	U
Nickel	11.6		33.0		17.3		14.1		29.0		33.3		7.3		17.3	
Selenium	0.59	UJ	0.62	UJ	0.73	UJ	0.61	UJ	0.61	ប្យ	0.64	υJ	0.61	ប្យ	1.2	UJ
Silver	0.59	U	0.62	U	0.73	U	0.61	U	0.61	U	0.64	U	0.61	U	0.6	U
Thallium	1.2	U	1.2	U	1.5	U	1.2	U	1.2	U	1.3	U	1.2	U	1.2	U
Zinc	28.2		81.3		63.1		54.4		74.6		80.7		27.1		50.6	

U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

Greiner's Lagoon Site, Fremont Ohio

SAMPLE LOCATION:	GL-WS-SM	-1	CL-WS-SM-1	DUP	GL-WS-SN	1-4	GL-WS-SN	1-8	GL-WS-SI	M-9	GL-WS-MV	V-4	GL-WS-MI	W-5
DATE COLLECTED:	4/9/96		4/9/96		4/11/96	5	4/11/96	5	4/12/9	6	7/22/96	•	7/23/90)
Volatile Organics														
Chloromethane	10000	U	5000	υ	8300	U	12000	υ	10	υ	10	υ	100	υ
Bromomethane	10000	υ	5000	U	8300	U	12000	U	10	U	10	U	100	U
Vinyl chloride	10000	U	5000	U	8300	U	12000	U	10	U	10	U	100	U
Chloroethane	10000	U	5000	U	8300	U	12000	U	10	U	10	U	100	U
Methylene chloride	5000	υ	2500	U	4200	U	6200	U	5.0	U	5.0	U	50	U
Acetone	27000		23000		110000		170000		18	В	11	J	1600	
Carbon disulfide	5000	U	2500	ч	4200	U	6200	U	5.0	U	5.0	U	50	บ
1,1-Dichloroethene	5000	U	2500	U	4200	U	6200	U	5.0	U	5.0	U	50	บ
1,1 Dichloroethane	5000	U	2500	U	4200	U	6200	U	5.0	บ	5.0	U	50	U
1,2-Dichloroethene (total)	5000	U	2500	U	4200	U	6200	U	5.0	U	5.0	U	50	U
Chloroform	5000	U	2500	U	4200	U	6200	U	5.0	U	5.0	U	50	U
1,2-Dichloroethane	5000	U	2500	U	4200	U	6200	U	5.0	U	5.0	บ	50	υ
2-Butanone	20000	U	10000	U	22000		25000	U	20	บ	20	บ	200	U
1,1,1 Trichloroethane	5000	U	2500	U	4200	U	6200	υ	5.0	U	5.0	U	50	U
Carbon tetrachloride	5000	U	2500	υ	4200	U	6200	U	5.0	U	5.0	U	50	U
Bromodichloromethane	5000	U	2500	U	4200	U	6200	U	5.0	U	5.0	U	50	U
1,2-Dichloropropane	5000	U	2500	U	4200	U	6200	U	5.0	U	5.0	U	50	U
cis 1,3 Dichloropropene	5000	U	2500	U	4200	U	6200	U	5.0	U	5.0	U	50	U
Trichloroethene	5000	υ	2500	U	4200	U	6200	U	5.0	U	5.0	U	50	U
Dibromochloromethane	5000	υ	2500	υ	4200	υ	6200	υ	5.0	υ	5.0	υ	50	U
1,1,2-Trichloroethane	5000	U	2500	U	4200	U	6200	U	5.0	U	5.0	U	50	U
Benzene	2200	J	2300	J	4200	U	6200	U	5.0	U	9.1		110	
trans-1,3-Dichloropropene	5000	U	2500	U	4200	U	6200	U	5.0	U	5.0	บ	50	บ
Bromoform	5000	U	2500	U	4200	U	6200	U	5.0	บ	5.0	U	50	บ
4-Methyl-2-pentanone	120000		<i>7</i> 5000		110000		85000		20		20	U	260	
2-Hexanone	20000	U	10000	บ	17000	U	25000	U	20	U	20	υ	200	U
Tetrachloroethene	5000	U	2500	บ	4200	U	6200	U	5.0	U	5.0	U	50	U
1,1,2,2-Tetrachloroethane	5000	บ	2500	U	4200	บ	6200	บ	5.0	U	5.0	U	50	U
Toluene	3000	В	3300	В	10000		6200	U	5.0	U	5.0	U	50	U
Chlorobenzene	5000	U	2500	U	4200	U	6200	U	5.0	υ	5.0	U	50	U
Ethylbenzene	5000	U	2500	U	3800	J	6200	U	5.0	U	5.0	U	50	U
Styrene	5000	U	2500	U	4200	U	6200	U	5.0	U	5.0	U	50	U
Xylenes (total)	1400	j	1300)	19000		6200	บ	5.0	บ	5.0	ប	50	U
Vinyl acetate	10000	υ	5000	U	8300	U	12000	U	10	U	10	U	100	U

All values in ug/L

- U This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.
- J This result should be considered a quantitative estimate.
- B This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration. Blank cells indicate constituent not analyzed for.

SAMPLE LOCATION:	GL-WS-M	W-6 (GL-WS-N	/W-7	GL-WS-MW	'-8	MW-4		MW-5		MW-6		MW-7		MW-8		Duplicate 2 (MW-5)
DATE COLLECTED:	7/23/96	5	7/23/	96	7/22/96		11/11/98		11/11/98		11/11/98		11/11/98		11/11/98		11/11/98
Volatile Organics		-													····· *		·
Chloromethane	1200	U	5000	U	10	U											
Bromomethane	1200	U	5000	U	10	U											
Vinyl chloride	1200	U	5000	U	10	U											
Chloroethane	1200	U	5000	U	10	U											
Methylene chloride	620	U	2500	U	5.0	U											
Acetone	24000	J	58000		7.8	J	8.3	J	500		1400		19	j	6.3	J	440
Carbon disulfide	620	U	2500	U	5.0	U											
1,1-Dichloroethene	620	U	2500	U	5.0	. U	5.0	U	25	U	100	U	5.0	U	5.0	U	5.0
1,1-Dichloroethane	620	U	2500	U	5.0	U											
1,2-Dichloroethene (total)	620	U	2500	U	5.0	U											
Chloroform	620	U	2500	U	5.0	U											
1,2-Dichloroethane	620	U	2500	U	5.0	U											
2-Butanone	47 0	J	1500	J	20	U	20	U	<i>7</i> 7	J	400	U	20	U	20	U	72
1,1,1-Trichloroethane	620	Ū	2500	U	5.0	U											
Carbon tetrachloride	620	U	2500	U	5.0	U											
Bromodichloromethane	620	U	2500	U	5.0	บ											
1,2-Dichloropropane	620	U	2500	U	5.0	U											
cis-1,3-Dichloropropene	620	U	2500	U	5.0	U											
Trichloroethene	620	U	2500	U	5.0	U	5.0	U	25	U	100	U	5.0	U	5.0	U	5.0
Dibromochloromethane	620	U	2500	U	5.0	U											
1,1,2-Trichloroethane	620	U	2500	U	5.0	U											
Benzene	620	U	2500	U	5.0	U	1.6	J	63	J	18	J	23		1.3	J	57
trans-1,3-Dichloropropene	620	U	2500	U	5.0	U											
Bromoform	620	U	2500	U.	5.0	U											
4-Methyl-2-pentanone	12000		30000		20	U	20	U	80	J	600		20	U	20	U	95
2-Hexanone	2500	U	10000	U	20	U											
Tetrachloroethene	620	U	2500	U	5.0	U											
1,1,2,2-Tetrachloroethane	620	U	2500	U	5.0	U											
Toluene	620	U	2500	U	5.0	U	5.0	U	8.5	J	100	U	5.0	U	5.0	U	8.4
Chlorobenzene	620	U	2500	U	5.0	U	5.0	U	25	υ	100	U	5.0	U	5.0	U	5.0
Ethylbenzene	620	U	2500	U	5.0	U	5.0	U	5.7	J	100	U	5.0	υ	5.0	U	4.7
Styrene	620 .	U	2500	U	5.0	U											
Xylenes (total)	620	U	2500	U	5.0	U	5.0	U	11	J	100	U	5.0	U	5.0	U	10
Vinyl acetate	1200	U	5000	U	10	U											

All values in ug/L

Blank cells indicate constituent not analyzed for.

U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

J - This result should be considered a quantitative estimate.

B - This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration.

Greiner's Lagoon Site, Fremont Ohio

Sample Collection	GL-WS-SN	1-1	GL-WS-SM-1	OUP	GL-WS-SI	M-4	CL-WS-SI	M-8	GL-WS-S	M-9	GL-WS-M	W-4	GL-WS-M	W-5	GL-WS-MW
Date Collected	4/9/96		4/9/96		4/11/9	6	4/11/9	6	4/12/9		7/22/90	5	7/23/9		7/23/96
Semivolatile Organics							, ,						7 - 7	<u> </u>	7/20/20
Phenol	44000		44000		5800		320000		49	1	10	U	180	1	36000
bis(2 Chloroethyl) ether	12000	υ	9800	U	500	U	80000	U	200	Ú	10	Ū	200	ΰ	8000
2 Chlorophenol	12000	U	9800	U	500	Ū	80000	Ū	200	Ü	10	Ū	200	Ű	8000
1,3-Dichlorobenzene	12000	U	9800	U	500	U	80000	Ü	200	Ū	10	Ü	200	Ü	8000
1,4-Dichlorobenzene	12000	U	9800	U	500	U	80000	Ü	200	Ü	10	Ü	200	Ü	8000
1,2-Dichlorobenzene	12000	U	9800	U	500	U	80000	Ū	200	Ū	10	Ü	200	Ū	8000
2 Methylphenol	12000	U	1200	J	, 500	U	80000	U	200	Ū	10	Ū	200	Ŭ	8000
2,2'-Oxybis(1-Chloropropane)	12000	U	9800	Ù	500	υ	80000	υ	200	U	10	U	200	Ū	8000
4 Methylphenol	5100	i	5100	ŀ	910		80000	Ū	200	Ü	10	Ü	200	Ū	8000
N Nitrosodi n propylamine	12000	Ú	9800	Ú	500	U	80000	Ū	2()()	Ū	10	U	200	Ü	8000
Hexachloroethane	12000	U	9800	U	500	U	80000	U	2(X)	Ū	10	Ü	200	Ū	8000
Nitrobenzene	12000	U	9800	U	500	U	80000	Ū	200	Ū	10	Ü	200	Ū	8000
Isophorone	12000	U	9800	U	530		80000	U	200	Ū	10	U	2(X)	Ü	8000
2 Nitrophenol	12000	υ	9800	υ	500	ប	80000	U	200	Ü	10	Ü	200	Ü	8000
2,4 Dimethylphenol	12000	U	9800	U	500	U	80000	U	200	U	10	U	200	Ū	8000
bis(2 Chloroethoxy)methane	12000	U	9800	U	500	U	80000	U	2(X)	U	10	U	200	IJ	8000
2,4 Dichlorophenol	12000	υ	9800	U	500	υ	80000	U	200	U	10	U	2(X)	IJ	8000
1,2,4 Trichlorobenzene	12000	U	9800	U	500	U	80000	U	200	U	10	U	200	U	8000
Naphthalene	12000	U	9800	U	490	J	80000	U	200	IJ	10	U	200	U	8000
4 Chloroaniline	12000	U	9800	U	500	Ù	80000	U	200	U	10	U	200	U	8000
Hexachlorobutadiene	12000	U	9800	U	500	U	80000	U	200	U	10	U	200	U	8000
4 Chloro-3 methylphenol	12000	U	9800	U	500	U	80000	U	200	U	10	U	200	U	8000
2 Methylnaphthalene	12000	U	9800	U	500	U	80000	U	200	U	10	U	200	U	8000
Hexachlorocyclopentadiene	60000	U	49000	U	2500	U	400000	U	1000	U	50	U	1000	U	40000
2,4,6-Trichlorophenol	12000	U	9800	U	500	U	80000	U	200	U	10	U	200	IJ	8000
2,4,5-Trichlorophenol	12000	U	9800	U	500	U	80000	U	200	U	10	U	200	U	8000
2 Chloronaphthalene	12000	U	9800	U	500	U	80000	U	200	U	10	U	200	U	8000
2 Nitronniline	60000	U	49000	U	2500	U	400000	U	1000	U	50	U	1000	U	40000
Dimethyl phthalate	12000	U	9800	U	500	U	80000	U	200	U	10	U	200	U	8000
Acenaphthylene	12000	U	9800	U	500	U	80000	U	200	ប	10	U	200	U	8000
2,6-Dinitrotoluene	12000	U	9800	U	500	υ	80000	U	200	U	10	U	200	U	8000
3-Nitroaniline	60000	U	49000	U	2500	U	400000	υ	1000	U	50	U	1000	บ	40000
Acenaphthene	12000	U	9800	U	500	U	80000	U	200	U	10	U	200	υ	8000
2,4-Dinitrophenol	60000	U	49000	U	2500	U	400000	U	1000	U	50	U	1000	U	40000

U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

J - This result should be considered a quantitative estimate.

UJ - This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate.

NA - Not Analyzed

Greiner's Lagoon Site, Fremont Ohio

Sample Collection	GL-WS-SN	1 -1	GL-WS-SM-1	OUP	GL-WS-SI	VI-4	GL-WS-SI	√1-8	GL-WS-SI	M-9	GL-WS-M	W-4	GL-WS-M	W-5	GL-WS-MW
Date Collected	4/9/96		4/9/96		4/11/9	6	4/11/9	5	4/12/9	6	7/22/90	6	7/23/9	6	7/23/96
Semivolatile Organics							-								
4-Nitrophenol	60000	U	49000	U	2500	U	400000	U	1000	U	50	U	1000	U	40000
Dibenzofuran	12000	U	9800	U	500	U	80000	U	200	U	10	U	200	U	8000
2,4-Dinitrotoluene	12000	U	9800	U	500	U	80000	U	200	U	10	U	200	U	8000
Diethyl phthalate	12000	U	9800	U	500	U	80000	U	200	U	10	U	200	U	8000
4-Chlorophenyl phenyl ether	12000	U	9800	U	500	U	80000	U	200	U	10	U	200	ប	8000
Fluorene	12000	U	9800	ប	500	U	80000	U	200	Ū	10	U	200	U	8000
4-Nitroaniline	60000	U	49000	U	_i 2500	U	400000	U	1000	U	50	U	1000	U	40000
4,6-Dinitro-2-methylphenol	60000	U	49000	U	2500	U	400000	U	1000	U	50	U	1000	U	40000
N-Nitrosodiphenylamine	12000	U	9800	U	500	U	80000	U	200	Ū	10	U	200	U	8000
4-Bromophenyl phenyl ether	12000	U	9800	U	500	U	80000	U	200	U	10	U	200	U	8000
Hexachlorobenzene	12000	U	9800	U	500	U	80000	U	200	U	10	U	200	U	8000
Pentachlorophenol	60000	U	49000	U	2500	U	400000	U	1000	U	50	U	1000	U	40000
Phenanthrene	12000	U	9800	U	500	U	80000	U	200	U	10	U	200	U	8000
Anthracene	12000	U	9800	U	500	U	80000	U	200	U	10	U	200	U	8000
Carbazole	12000	U	9800	U	500	U	80000	U	200	U	10	U	200	U	8000
Di-n-butyl phthalate	12000	U	9800	U	500	U	80000	U	200	U	10	U	200	U	8000
Fluoranthene	12000	U	9800	U	500	U	80000	U	200	U	10		200	U	8000
Pyrene	12000	U	9800	U	500	U	80000	U	200	U	10	U	200	U	8000
Butyl benzyl phthalate	12000	U	9800	U	500	U	80000	U	200	U	10	U	200	U	8000
3,3'-Dichlorobenzidine	60000	U	49000	U	2500	U	400000	U	1000	U	50	U	1000	U	40000
Benzo(a)anthracene	12000	U	9800	ប	500	IJ	80000	U	200	U	10	U	200	U	8000
Chrysene	12000	U	9800	U	500	U	80000	U	200	U	10	U	200	U	8000
bis(2-Ethylhexyl) phthalate	12000	Ū	4700	Ţ	4100		80000	U	200	U	10	U	200	U	8000
Di-n-octyl phthalate	12000	U	9800	Ú	500	U	80000	U	200	U	10	U	200	U	8000
Benzo(b)fluoranthene	12000	Ū	9800	U	500	U	80000	U	200	U	10	U	200	U	8000
Benzo(k)fluoranthene	12000	Ū	9800	Ū	500	Ū	80000	U	200	Ų	10	U	200	U	8000
Benzo(a)pyrene	12000	Ū	9800	Ū	500	Ū	80000	Ū	200	Ü	10	U	200	U	8000
Indeno(1,2,3-cd)pyrene	12000	Ū	9800	Ū	500	Ū	80000	Ū	200	Ū	10	Ū	200	U	8000
Dibenz(a,h)anthracene	12000	U	9800	Ū	500	Ū	80000	Ū	200	Ū	10	Ū	200	U	8000
Benzo(ghi)perylene	12000	U	9800	Ū	500	Ū	80000	Ū	200	Ū	10	Ū	200	U	8000

Notes:

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NA - Not Analyzed

Continuery of Controller Continues Continues of Controller Controller Controller Continues Continues Continues Controller

Sample Collection	GL-WS-MW-7	•	CL-WS-N	8-W	MW-4		MW-5		MW-6		MW-7		MW-8		Duplicate 2 (MW-	5)
Date Collected	7/23/96		7/22/9	96	11/11/98		11/11/98		11/11/98		11/11/98		11/11/98		11/11/98	
Semivolatile Organics															<u>-</u>	
Phenol	9300		10	UJ	50	U	100	U	1400		100	U	40	U	200	U
bis(2-Chloroethyl) ether	2000	U	10	Ú	NA		NA		NA		NA		NA		NA	
2-Chlorophenol	2000	U	10	Uj	50	U	100	υ	250	υ	100	υ	40	U	200	บ
1,3-Dichlorobenzene	2000	U	10	Ú	NA		NA		NA		NA		NA		NA	
1,4-Dichlorobenzene	2000	U	10	U	50	U	100	U	250	U	100	U	40	U	200	U
1,2-Dichlorobenzene	2000	U	10	U	50	U	100	U	250	U	100	U	40	U	200	U
2 Methylphenol	2000	U	10	UJ	լ 50	U	100	υ	250	U	100	U	40	U	200	U
2,2'-Oxybis(1-Chloropropane)	2000	U	10	Ü	NA .	,	NA		NA		NA		NA		NA	
4 Methylphenol	2000	U	10	UJ	50	U	100	U	250	U	100	U	40	U	200	U
N Nitrosodi n propylamine	2000	U	10	U	50	U	100	U	250	U	100	U	40	U	200	U
Hexachloroethane	2000	U	10	U	NA		NA		NA		NA		NA		NA	
Nitrobenzene	2000	U	10	U	NA		NA		NA		NA		NA		NA	
Isophorone	2000	U	10	U	50	U	100	U	250	U	100	U	40	υ	200	U
2 Nitrophenol	2000	U	10	UJ	NA		NA		NA		NA		NA		NA	
2,4 Dimethylphenol	2000	U	10	Uj	NA		NA		NA		NA		NA		NA	
bis(2-Chloroethoxy)methane	2000	U	10	U	NA		NA		NA		NA		NA		NA	
2,4-Dichlorophenol	2000	U	10	UJ	NA		NA		NA		NA		NA		NA	
1,2,4-Trichlorobenzene	2000	U	10	U	50	U	100	U	250	U	100	U	40	U	200	U
Naphthalene	2000	U	10	U	50	U	100	U	250	U	100	U	40	U	200	U
4 Chloroaniline	2000	υ	10	υ	NA		NA		NA		NA		NA		NA	
Hexachlorobutadiene	2000	U	10	U	NA		NA		NA		NA		NA		NA	
4-Chloro-3 methyl <mark>phenol</mark>	2000	U	10	UJ	50	U	100	U	250	U	100	U	40	U	200	U
2-Methylnaphthalene	2000	U	10	U	50	U	100	U	250	υ	100	U	40	U	200	U
Hexachlorocyclopentadiene	10000	U	50	U	NA		NA		NA		NA		NA		NA	
2,4,6-Trichlorophenol	2000	U	10	UJ	NA		NA		NA		NA		NA		NA	
2,4,5 Trichlorophenol	2000	υ	10	υj	NA		NA		NA		NA		NA		NA	
2-Chloronaphthalene	2000	U	10	Ú	NA		NA		NA		NA		NA		NA	
2-Nitroaniling	10000	U	50	บ	NA		NA		NA		NA		NA		NA	

All results are reported in units of ug/L.

10

10

10

50

10

50

U

U

U

U

U

U

NA

NA

NA

NA

50

NA

U

NA

NA

NA

NA

100

NA

U

NA

NA

NA

NA

250

NA

NA

NA

NA

NA

100

NA

U

U

NA

NA

NA

NA

40

NA

U

NA

NA

NA

NA

200

NA

U

U

U

U

U

U

2000

2000

2000

10000

2000

10000

Dimethyl phthalate

Acenaphthylene

3-Nitroaniline

Acenaphthene

2,4-Dinitrophenol

2,6-Dinitrotoluene

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Sample Collection	GL-WS-MW-7	7	GL-WS-M	V-8	MW-4	_	MW-5		MW-6		MW-7		MW-8		Duplicate 2 (MW	-5)
Date Collected	7/23/96		7/22/96	5	11/11/98		11/11/98		11/11/98		11/11/98		11/11/98		11/11/98	
Semivolatile Organics																
4-Nitrophenol	10000	U	50	IJ	250	U	500	U	1250	U	500	U	200	U	1000	U
Dibenzofuran	2000	U	10	U	NA		NA		NA		NA		NA		NA	
2,4-Dinitrotoluene	2000	U	10	U	50	U	100	U	250	U	100	U	40	U	200	υ
Diethyl phthalate	2000	U	10	U	NA		NA		NA		NA		NA		NA	
4-Chlorophenyl phenyl ether	2000	U	10	U	NA		NA		NA		NA		NA		NA	
Fluorene	2000	U	10	U	NA		NA		NA		NA		NA		NA	
4-Nitroaniline	10000	U	50	U	ŅΑ		NA		NA		NA		NA		NA	
4,6-Dinitro-2-methylphenol	10000	U	50	UJ	NA		NA		NA		NA		NA		NA	
N-Nitrosodiphenylamine	2000	U	10	U	NA		NA		NA		NA		NA		NA	
4-Bromophenyl phenyl ether	2000	U	10	U	NA		NA		NA		NA		NA		NA	
Hexachlorobenzene	2000	U	10	U	NA		NA		NA		NA		NA		NA	
Pentachlorophenol	10000	U	50	UJ	50	U	100	U	250	U	100	U	40	U	200	U
Phenanthrene	2000	U	10	U	NA		NA		NA		NA		NA		NA	
Anthracene	2000	U	10	U	NA		NA		NA		NA		NA		NA	
Carbazole	2000	U	10	U	NA		NA		NA		NA		NA		NA	
Di-n-butyl phthalate	2000	U	10	U	NA		NA		NA		NA		,NA		NA	
Fluoranthene	2000	U	10	U	50	U	100	U	250	U	100	U	40	U	200	บ
Pyrene	2000	U	10	U	50	U	100	U	250	U	100	U	40	U	200	U
Butyl benzyl phthalate	2000	U	10	U	NA		NA		NA		NA		NA		NA	
3,3'-Dichlorobenzidine	10000	U	50	U	NA		NA		NA		NA		NA		NA	
Benzo(a)anthracene	2000	U	10	U	NA		NA		NA		NA		NA		NA	
Chrysene	2000	Ų	10	U	NA		NA		NA		NA		NA		NA	
bis(2-Ethylhexyl) phthalate	2000	U	10	U	50	U	100	U	250	U	100	U	40	U	200	U
Di-n-octyl phthalate	2000	U	10	U	NA		NA		NA		NA		NA		NA	
Benzo(b)fluoranthene	2000	U	10	U	NA		NA		NA		NA		NA		NA	
Benzo(k)fluoranthene	2000	U	10	U	NA		NA		NA		NA		NA		NA	
Benzo(a)pyrene	2000	U	10	U	NA		NA		NA		NA		NA		NA	
Indeno(1,2,3-cd)pyrene	2000	U	10	U	NA		NA		NA		NA		NA		NA	
Dibenz(a,h)anthracene	2000	U	10	U	NA		NA		NA		NA		NA		NA	
Benzo(ghi)perylene	2000	U	10	U	NA		NA		NΑ		NA		NA		NA	

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Summary of Pesticides/PCBs Data for Perched On-Site Ground Water Greiner's Lagoon Site, Fremont Ohio

SAMPLE LOCATION:	GL-WS-SN	1-1	GL-WS-SM-1	DUP	GL-WS-SI	M-4	GL-WS-SI	M-8	GL-WS-S	M-9	GL-WS-M	[W-4	GL-WS-N	1W-5	GL-WS	MW-6
DATE COLLECTED:	4/9/96		4/9/96		4/11/9	6	4/11/9	6	4/12/9	26	7/22/9	}6	7/23/		7/23	
Pesticides		•		<u></u>					-,,	•	,,, ,		, , =,		*/**	, ,,,
nlphn-BHC	30	U	30	U	13	U	140	U	3.2	U	0.050	UJ	2.5	ບງ	12	UJ
beta-BHC	30	U	30	บ	13	Ū	140	Ū	3.2	Ū	0.050	υj	2.5	UJ	12	UJ
delta-BHC	30	U	30	Ū	13	Ū	140	Ū	3.2	Ū	0.050	uj	2.5	uj	12	UJ
gamma-BHC (Lindane)	30	บ	30	υ	13	U	140	Ū	3.2	Ū	0.050	UJ	2.5	υj	12	UJ
Heptachlor	30	υ	30	บ	13	U	140	Ū	3.2	Ū	0.050	υj	2.5	Uj	12	UJ
Aldrin	30	U	30	U	13	U	140	Ü	3.2	Ū	0.050	Uj	2.5	U)	12	U)
Heptachlor epoxide	30	U	30	U	13	U	140	Ū	3.2	Ū	0.050	UJ	2.5	Uj	12	UJ
Endosulfan I	30	U	30	U	13	U	140	Ū	3.2	Ü	0.050	Uj	2.5	UJ	12	UJ
Dieldrin	60	U	60	Ū	26	Ū	280	ΰ	6.4	Ū	0.050	UJ	5.0	U	25	UJ
4,4'-DDE	60	U	60	U	26	Ū	280	Ū	6.4	Ū	0.050	Uj	5.0	UJ	25	UJ
Endrin	60	U	60	U	26	U	280	Ū	6.4	Ū	0.050	UJ	5.0	Uj	25	U)
Endosulfan II	60	U	60	บ	26	U	280	Ū	6.4	Ū	0.050	Uj	5.0	UJ	25	UJ
4,4'-DDD	60	υ	60	Ū	26	Ū	280	Ū	6.4	Ū	0.050	UJ	5.0	UI	25	UJ
Endosulfan sulf ate	60	U	60	บ	26	Ü	280	υ	6.4	Ū	0.050	Uj	5.0	UJ	25	U)
4,4'-DDT	60	U	60	υ	26	U	280	U	6.4	Ū	0.050	Uj	5.0	Ü	25	Uj
Methoxychlor	300	U	300	υ	130	U	1400	Ū	32	IJ	0.25	υj	25	UJ	120	UJ
Endrin ketone	60	U	60	U	26	Ū	280	Ū	6.4	Ü	0.050	U	5.0	UJ	25	UJ
Endrin aldehyde	60	U	60	υ	26	U	280	U	6.4	Ü	0.050	υj	5.0	Új	25	υj
alpha-Chlordane	30	U	30	U	13	U	140	υ	3.2	U	0.050	υj	2.5	Új	12	ÚJ
gamma Chlordane	30	U	30	υ	13	U	140	υ	3.2	Ū	0.050	Új	2.5	Új	12	Új
Toxaphene	1500	U	1500	U	660	U	7000	υ	160	U	2.0	υj	120	Új	620	ÚĴ
Aroclor 1016	300	U	300	บ	260	U	2800	U	64	Ū	1.0	Új	25	Új	120	υj
Aroclor 1221	300	υ	300	ΰ	260	Ū	2800	U	64	Ū	1.0	υj	25	Új	120	υj
Aroclor 1232	300	Ū	300	Ū	260	Ū	2800	Ū	64	Ū	1.0	ບ່າ	25	υj	120	υj
Aroclor 1242	300	U	300	Ū	260	Ū	2800	Ū	64	U	1.0	Új	25	Új	120	υj
Aroclor 1248	300	U	300	U	260	U	2800	U	64	Ū	1.0	Új	25	Ú	120	υj
Aroclor 1254	600	υ	600	U	260	Ū	2800	Ū	64	Ū	1.0	Új	50	Új	250	υj
Aroclor 1260	600	U	600	U	260	Ū	2800	Ū	64	Ū	1.0	Új	50	Új	250	υj

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SAMPLE LOCATION:	GL-WS-N	/W-7	GL-WS-M	W-8
DATE COLLECTED:	7/23/	96	7/22/9	6
Pesticides	-1			
alpha-BHC	1.2	ប្យ	0.050	υJ
beta-BHC	1.2	ប្យ	0.050	ប្យ
delta-BHC	1.2	UJ	0.050	UJ
gamma-BHC (Lindane)	1.2	υj	0.050	ប្យ
Heptachlor	1.2	UJ	0.050	UJ
Aldrin	1.2	UJ	0.050	UJ
Heptachlor epoxide	1.2	UJ	0.050	υJ
Endosulfan I	1.2	UJ	0.050	UJ
Dieldrin	2.5	IJ	0.050	UJ
4,4'-DDE	2.5	ប្យ	0.050	UJ
Endrin	2.5	UJ	0.050	UJ
Endosulfan II	2.5	IJ	0.050	UJ
4,4'-DDD	2.5	UJ	0.050	UJ
Endosulfan sulfate	2.5	UJ	0.050	UJ
4,4'-DDT	2.5	UJ	0.050	UJ į
Methoxychlor	12	UJ	0.25	ប្យ
Endrin ketone	2.5	ຫຼ	0.050	ប្យ
Endrin aldehyde	2.5	UJ	0.050	UJ
alpha-Chlordane	1.2	ប្យ	0.050	ប្យ
gamma-Chlordane	1.2	ប្យ	0.050	υJ
Toxaphene	62	UJ	2.0	UJ
Aroclor 1016	12	UJ	1.0	UJ
Aroclor 1221	12	ប្យ	1.0	UJ
Aroclor 1232	12	UJ	1.0	UJ
Aroclor 1242	12	UJ	1.0	UJ
Aroclor 1248	12	· UJ	1.0	UJ
Aroclor 1254	25	UJ	1.0	UJ
Aroclor 1260	25	UJ	1.0	UJ

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Summary of Metals Data for Perched On-Site Ground Water
Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-WS-S	M-1	GL-WS-SM-1	DUP	GL-WS-S	M-4	GL-WS-SM	1-8	GL-WS-SM	-9	GL-WS-M	IW-4	GL-WS-N	∕W-5
Date Collected	4/9/9	5	4/9/96		4/11/9	6	4/11/96	,	4/12/96		7/22/9	}6	7/23/	96
Metals		•												
Aluminum	52.6		62.4		NA		NA		NA		NA		NA	
Antimony	0.020	J	0.017	J	0.010	U	0.010	υ	0.020	U	0.010	U	0.010	υ
Arsenic	0.081	j	0.025	J	0.095		0.35		0.11		0.025		0.034	
Barium	9.3		8.8		NA		NA		NA		NA		NA	
Beryllium	0.0050	UJ	0.0050	UJ	0.0050	U	0.0050	U	0.010	U	0.005	U	0.005	U
Cadmium	0.022	j	0.024	J	0.011		0.0085		0.013		0.002	U	0.002	U
Chromium	0.26		0.27		0.070		0.10		0.20		0.035		0.027	
Cobalt	0.050	UJ	0.050	J	NA		NA		NA		0.050	U	0.050	U
Copper	0.54	J	0.60	j	0.18		0.18		0.63		0.057		0.038	
Iron	102		110		NA		NA		NA		NA		NA	
Lead	3.5		3.2		0.19		0.21		0.33		0.026		0.016	
Manganese	2.2		2.3		NA		NA		NA		NA		NA	
Mercury	0.0022	j	0.0064	J	0.0010	U	0.00020	U	0.00052		0.0002	U	0.0002	U
Nickel	0.30	J	0.30	J	0.17		0.84		0.42		0.074		0.063	
Selenium	0.040	UJ	0.020	UJ	0.020	UJ	0.040	UJ	0.010	UJ	0.010	UJ	0.005	UJ
Silver	0.0050	U	0.0050	U	0.010	U	0.0050	U	0.010	U	0.005	U	0.005	U
Thallium	0.010	UJ	0.010	UJ	0.020	U	0.010	U	0.020	U	0.010	υ	0.010	U
Vanadium	0.19	J	0.22	. J	NA		NA		NA		NA		NA	
Zinc	3.4		3.6	-	1.1		0.68		1.6		0.18		0.14	

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Summary of Metals Data for Perched On-Site Ground Water Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-WS-M	1W-6	GL-WS-M	ſW-7	GL-WS-M	1W-8	MW-4		MW-5		MW-6		MW-7		MW-8	Dup	olicate 2 (M
Date Collected	7/23/	96	7/23/9	96	7/22/9	96	11/11/98		11/11/98		11/11/98		11/11/98		11/11/98	_	11/11/98
Metals																	
Aluminum	NA		NA		NA		NA		NA		NA		NA		NA		NA
Antimony	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010
Arsenic	0.073		0.16		0.044		0.018	J	0.018	J	0.066	J	0.086	J	0.039	J	0.047
Barium	NA		NA		NA		NA		NA		NA		NA		NA		NA
Beryllium	0.005	U	0.005	U	0.005	U	0.0050	U	0.0050	U	0.0050	U	0.0050	Ū	0.0050	U	0.0050
Cadmium	0.002	U	0.0047		0.0079		0.0020	U	0.0020	U	0.0020	U	0.0020	U	0.0020	U	0.0020
Chromium	0.014		0.063		0.10		0.020		0.0070		0.0050	U	0.0050	U	0.0088		0.025
Cobalt	0.050	U	0.065		0.095		NA		NA		NA		NA		NA		NA
Copper	0.025	U	0.16		0.29		0.038		0.025	ប្យ	0.041		0.028		0.026		0.15
Iron	NA		NA		NA		NA		NA	-	NA		NA		NA		NA
Lead	0.0074		0.067		0.096		0.013		0.0030	U	0.0030	U	0.0033		0.0088		0.019
Manganese	NA		NA		NA		NA		NA		NA		NA		NA		NA
Mercury	0.0002	U	0.0002	U	0.0002	U	0.00020	U	0.00020	U	0.00020	U	0.00020	U	0.00020	U	0.00020
Nickel	0.040	U	0.19		0.21		0.040	U	0.040		0.040	U	0.040	U	0.040	U	0.11
Selenium	0.020	UJ	0.010	UJ	0.010	UJ	0.020	UJ	0.0050	IJ	0.010	UJ	0.0050	UJ	0.010	UJ	0.0050
Silver	0.005	U	0.005	U	0.005	U	0.0050	U	0.0050	U	0.0050	U	0.0050	U	0.0050	U	0.0050
Thallium	0.010 .	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010
Vanadium	NA		NA		NA		NA		NA		NA		NA		NA		NA
Zinc	0.072		0.40		0.69		0.15		0.13		0.063		0.11		0.12		0.30

All results are reported in units of mg/L.

U - This compound was analyzed but not detected. Value reported represents the detection limit.

Table A-12
Summary of Volatile Organics Data for Perched Off-Site Ground Water
Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-WS-C	:B-7	GL-WS-G	B-15	MW	9	MW-	10	MW-	11	MW-	12	MW-1	3	MW-	13	MW-1	13	MW	14	Duplicate 1 (M	W-14)
Date Collected	12/18/	96	12/20/	96	11/11/	/98	11/11,	/98	11/11,	/98	11/11	/98	11/11/	96	1/20/	99	1/28/	99	11/11	/98	11/11/98	8
Volatile Organics													-									
Acetone	20	U	20	U	16	J	10	J	11	J	19	J	4000		20	UJ	20	บ	20	U	20	υ
1,1-Dichloroethene	NA		NA		5.0	U	5.0	U	5.0	U	5.0	U	170	U	5.0	U	5.0	U	5.0	U	5.0	υ
2-Butanone	20	U	20	U	20	U	20,	U	20	U	20	U	670	U	20	U	20	U	20	U	20	U
Trichloroethene	NA		NA		5.0	U	5.0	U	5.0	υ	5.0	U	170	U	5.0	U	5.0	U	5.0	U	5.0	υ
Benzene	5	U	5	UJ	5.0	U	5.0	U	5.0	U	5.0	U	170	U	5.0	IJ	5.0	U	5.0	U	5.0	U
4 Methyl 2-pentanone	20	บ	37	1	3.7	J	20	U	20	U	15	J	670	U	20	U	20	U	20	U	20	IJ
Toluene	5	U	5	UJ	5.0	บ	5.0	U	5.0	U	5.0	U	170	U	5.0	IJ	1 21	В	5.0	U	5.0	U
Chlorobenzene	NA		NA		5.0	υ	5.0	U	5.0	U	5.0	U	170	U	5.0	U	5.0	U	5.0	U	5.0	U
Ethylbenzene	5	U	5	UJ	5.0	U	5.0	U	5.0	Ų	5.0	U	170	υ	5.0	υ	5.0	υ	5.0	υ	5.0	u
Xylenes (total)	5	U	5	Uj	5.0	U	5.0	U	5.0	U	5.0	บ	170	υ	5.0	U	5.0	U	5.0	U	5.0	U

- U This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.
- \boldsymbol{J} This result should be considered a quantitative estimate.
- U] This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate.
- B This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration.
- NA Not Analyzed

Table A-13
Summary of Semivolatile Organics Data for Perched Off-Site Ground Water Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-WS-GB-7	GL-WS-GB-1	5 MW	1_9	MW-	10	MW-	11	MW-1	2	MW-1	3	MW-	14	Duplicate 1 (MV	N-14)
Date Collected	12/18/96	12/20/96	11/11	/98	11/11	/98	11/11,	/98	11/11/	98	11/11/	'98	11/11/	'98	11/11/98	
Semivolatile Organics													_			
Acenaphthene	NA	NA	200	U	100	U	100	U	100	U	200	U	100	U	50	U
2,4-Dinitrotoluene	NA	NA	200	ប	100	U	100	U	100	U	200	U	100	U	50	U
Pyrene	NA	NA	200	U	100	U	100	U	100	U	200	U	100	U	50	บ
N-Nitrosodi-n-propylamine	NA	NA	200	υ,	100	U	100	U	100	U	200	U	100	U	50	U
1,4-Dichlorobenzene	NA	NA	200	U	100	U	100	U	100	U	200	U	100	U	50	U
Pentchlorophenol	NA	NA	200	U	100	U	100	U	100	U	200	U	100	U	50	U
2-Chlorophenol	NA	NA	200	U	100	U	100	U	100	U	200	U	100	U	50	U
4-Chloro-3-methylphenol	NA	NA	200	U	100	U	100	U	100	U	200	U	100	U	50	U
4-Nitrophenol	NA	NA	1000	U	500	U	500	U	500	U	1000	U	500	U	250	U
bis(2-Ethylhexyl) phthalate	2.1 B	10 U	200	U	100	ប	100	บ	100	ប	200	U	100	U	50	U
1,2-Dichlorobenzene	10 U	10 U	200	U	100	U	100	U	100	U	200	U	100	U	50	U
Fluoranthene	10 U	10 U	200	U	100	U	100	U	100	U	200	U	100	U	50	U
Isophorone	10 U	10 U	200	U	100	ប	100	ប	100	U	200	U	100	U	50	U
2-Methylnapthalene	10 U	10 U	200	υ	100	U	100	U	100	υ	200	U	100	U	50	U
2-Methylphenol	10 U	10 U	200	U	100	U	100	U	100	U	200	U	100	U	50	U
4-Methylphenol	10 U	10 U	200	U	100	U	100	U	100	U	200	U	100	U	50	U
Napthalene	10 U	10 U	200	U	100	U	100	U	100	U	200	υ	100	ប	50	υ
Phenol	10 U	10 U	200	U	100	U	100	U	100	U	200	U	100	U	50	U
1,2,4-Trichlorobenzene	10 U	10 U	200	U	100	U	100	U	100	U	200	υ	100	U	50	U

All results are reported in units of ug/L.

NA - Not Analyzed

U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

B - This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration.

Table A-14
Summary of Metals Data for Perched Off-Site Ground Water
Greiner's Lagoon Site, Fremont Ohio

CL-WS-C	B-1	CL-WS-0	GB-3	GL-WS-0	GB-4	GL-WS-0	GB-7	OL-WS-C	B-9	GL-WS-C	B-11	CL-WS-C	B-13	MW9)	MW-1	0
12/16/9	96	12/17/	'96	12/17/	96	12/18/	96	12/18/	96	12/19/	96	12/19/	96	11/11/	98	11/11/	98
														<u>-</u>			
0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U
0.010	UJ	0.041	J	0.018	j	0.010	UJ	0.011	J	0.011	J	0.010	UJ	0.016	J	0.010	UJ
0.0050	U	0.0050	U	0.0050	U	0.0050	U	0.0093		0.014		0.0050	U	0.0050	U	0.0050	U
0.0020	U	0.0022		0.0055		0.0020	U	0.0086		0.020		0.0020	U	0.0020	U	0.0020	U
0.020		0.057		0.089		0.028		0.27		0.44		0.070		0.016		0.016	
0.050	U	0.050	U	0.050	U	0.050	U	0.22		0.35		0.050	U				
0.029		0.076		0.11		0.032		0.34		0.74		0.11		0.035		0.025	UJ
0.025		0.036		0.14		0.015		0.18		0.36		0.052		0.015		0.0095	
0.00020	UJ	0.00020	UJ	0.00056	1	0.00020	UJ	0.00045	j	0.00081	j	0.00020	UJ	0.00020	U	0.00020	U
0.040	Ú	0.11	•	0.12	·	0.040	Ú	0.48	·	0.86		0.14	•	0.040	U	0.040	U
0.0050	UJ	0.010	UJ	0.020	UJ	0.010	UJ	0.040	UJ	0.080	UJ	0.020	UJ	0.0050	UJ	0.010	UJ
0.0050	Ü	0,0050	Ú	0.0050	U	0.005	Ú	0.0050	U	0.0050	Ü	0.0050	Ú	0.0050	υ	0.0050	U
0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.020	U	0.010	U	0.010	U	0.010	U
0.098		0.32		0.72		0.13		1.5		2.8		0.42		0.13		0.095	
	12/16/9 0.010 0.0050 0.0020 0.020 0.050 0.029 0.025 0.00020 0.040 0.0050 0.0050 0.010	0.010 UJ 0.0050 U 0.0020 U 0.020 0.050 U 0.029 0.025 0.00020 UJ 0.040 U 0.0050 UJ 0.0050 U 0.0050 U	12/16/96 12/17/ 0.010 U 0.010 0.010 UJ 0.041 0.0050 U 0.0050 0.0020 U 0.0022 0.020 0.057 0.050 0.029 0.076 0.036 0.0025 0.036 0.00020 UJ 0.00020 0.040 U 0.11 0.0050 U 0.0050 0.0050 U 0.0050 U 0.0050 0.010 U 0.010 0.010	12/16/96 12/17/96 0.010 U 0.010 U 0.010 UJ 0.041 J 0.0050 U 0.0050 U 0.0020 U 0.0022 U 0.020 0.057 U 0.050 U 0.029 0.076 U 0.036 U 0.0025 0.036 U 0.00020 UJ 0.040 U 0.11 U 0.010 UJ 0.0050 UJ 0.0050 U 0.0050 U 0.010 U 0.010 U 0.010 U	12/16/96 12/17/96 12/17/96 12/17/96 0.010 U 0.010 U 0.010 0.010 UJ 0.041 J 0.018 0.0050 U 0.0050 U 0.0050 0.0020 U 0.0022 0.0055 0.020 0.057 0.089 0.050 U 0.050 U 0.050 0.029 0.076 0.11 0.11 0.04 0.0025 0.036 0.14 0.0050 0.04 0.12 0.040 U 0.11 0.12 0.020 0.0050 UJ 0.0000 UJ 0.020 0.0050 UJ 0.010 UJ 0.020 0.0050 U 0.0050 U 0.0050	12/16/96 12/17/96 12/17/96 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0.14 0.015 0.0050 U 0.0050 UJ 0.00020 UJ 0.00020 UJ 0.00056 J 0.00020 UJ 0.040 U 0.011 0.12 0.040 U 0.0050 U 0.020 UJ 0.010 U 0.005 U 0.005 <td< td=""><td>12/16/96 12/17/96 12/17/96 12/18/96 12/18/96 12/18/96 12/18/96 0.010 U 0.010 U 0.010 U 0.010 U 0.010 0.010 UJ 0.041 J 0.018 J 0.010 UJ 0.011 0.0050 U 0.0050 U 0.0050 U 0.0050 U 0.0093 0.020 U 0.057 0.089 0.028 0.27 0.050 U 0.050 U 0.050 U 0.050 0.029 0.076 0.11 0.032 0.34 0.025 0.036 0.14 0.015 0.18 0.00020 UJ 0.00020 UJ 0.00020 UJ 0.00045 0.040 U 0.11 0.12 0.040 U 0.48 0.0050 UJ 0.0050 U 0.005 U 0.005 U 0.005 0.0050 UJ</td><td>12/16/96 12/17/96 12/17/96 12/18/96 12/18/96 12/18/96 0.010 U 0.010 U 0.010 U 0.010 U 0.010 U 0.010 UJ 0.041 J 0.018 J 0.010 UJ 0.011 J 0.0050 U 0.0050 U 0.0050 U 0.0050 U 0.0093 0.0020 U 0.0057 0.089 0.028 0.27 0.050 U 0.050 U 0.050 U 0.22 0.029 0.076 0.11 0.032 0.34 0.022 0.029 0.036 0.14 0.015 0.18 0.0025 0.036 0.14 0.015 0.18 0.00020 UJ 0.00020 UJ 0.00020 UJ 0.00040 U 0.48 0.040 U 0.11 0.12 0.040 U 0.040 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0.0086 0.020 0.020 0.022 0.035 0.022 0.035 0.022 0.035 0.022 0.035 0.044 0.022 0.035 0.035 0.036 0.034 0.074 0.022 0.034 0.074 0.036 0.014 0.015 0.18 0.036 0.006 0.006	12/16/96 12/17/96 12/17/96 12/18/96 12/18/96 12/18/96 12/18/96 12/19/96 0.010 U 0.010 U 0.010 U 0.010 U 0.010 U 0.010 U 0.010 U 0.010 U 0.010 U 0.010 U 0.010 U 0.011 J 0.011 J 0.011 J 0.011 J 0.011 J 0.011 J 0.011 J 0.011 J 0.011 J 0.011 J 0.011 J 0.011 J 0.014 0.020 U 0.0089 0.028 0.27 0.44 0.050 U 0.022 0.35 0.044 0.022 0.35 0.044 0.022 0.34 0.74 0.022 0.34 0.74 0.025 0.018 0.036 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006	12/16/96 12/17/96 12/17/96 12/18/96 12/18/96 12/18/96 12/19/96 20/10 20/10 2	12/16/96 12/17/96 12/17/96 12/18/96 12/18/96 12/19/96 12/19/96 12/19/96 0.010 U 0.011 J 0.011 J 0.011 J 0.011 J 0.011 J 0.011 J 0.011 J 0.011 J 0.011 J 0.011 J 0.011 J 0.011 J 0.020 U 0.020 U 0.020 U 0.020 U 0.020 U 0.020 U 0.020 U 0.020 U 0.020 U 0.020 U 0.020 U	12/16/96 12/17/96 12/17/96 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U. This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

UJ - This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate.

Table A-14 (Con't)
Summary of Metals Data for Perched Off-Site Ground Water
Greiner's Lagoon Site, Fremont Ohio

Sample Location	MW-1	1	MW-1	2	MW-1	3	MW-1	4	Duplicate 1	(MW-14)
Date Collected	11/11/	98-	11/11/	98	11/11/	98	11/11/	98	11/11	/98
Metals			•							
Antimony	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U
Arsenic	0.011	J	0.010	UJ	0.039	j	0.027	J	0.029	J
Beryllium	0.0050	U	0.0050	U	0.0050	U	0.0050	U	0.0050	U
Cadmium	0.0020	U	0.0020	U	0.0020	U	0.0020	U	0.0020	U
Chromium	0.012		0.023		0.039		0.023		0.029	
Cobalt										
Copper	0.025	UJ	0.029		0.080		0.065		0.079	
Lead	0.011		0.014		0.037		0.029		0.032	U
Mercury	0.00020	U	0.00020	U	0.00020	U	0.00020	U	0.00020	
Nickel	0.040		0.040	U	0.084		0.066		0.073	UJ
Selenium	0.010	UJ	0.020	UJ	0.010	UJ	0.010	. UJ	0.010	U
Silver	0.0050	U	0.0050	U	0.0050	U	0.0050	U	0.0050	U
Thallium	0.010	U	0.010	U	0.010	U	0.010	U	0.010	
Zinc	0.11		0.13		0.24		0.21		0.26	

U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

UJ - This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate.

Table A-15
Summary of Volatile Organics Data for Deep Off-Site Ground Water
Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-WS-M	W-1	GL-WS-MW-1	DUP	GL-WS	MW-2	GL-WS-	MW-3	GL-WS-MW	-3	MW.	1	MW.	2	MW	3
Date Collected	7/24/9	76	7/24/96	•	7/23	/96	7/24,	/96	1/8/97		11/10/	98	11/10/	98	11/10/	/98
Volatile Organics																
Chloromethane	10	U	10	U	10	U	10	U	NA		NA		NA		NA	
Bromomethane	10	U	10	υ	10	U	10	U	NA		NA		NA		NA	
Vinyl chloride	10	υ	10	U	10	U	10	U	NA		NA		NA		NA	
Chloroethane	10	U	10	U	10	U	10	U	NA		NA		NA		NA	
Methylene chloride	5.0	U	5.0	U	5.0	U	5.0	υ	NA		NA		NA		NA	
Acetone	4.1	J	7.2	J	13	J	37		480	j	20	U	20	U	20	U
Carbon disulfide	5.0	U	5.0	U	5.0	U	5.0	U	NA		NA		NA		NA	
1,1-Dichloroethene	5.0	U	5.0	U	5.0	U	5.0	U	NA		5.0	U	5.0	U	5.0	U
1,1 Dichloroethane	5.0	U	5,0	U	5.0	U	5.0	U	NA		NA		NA		NA	
1,2 Dichloroethene (total)	5.0	U	5.0	U	5.0	U	5.0	υ	NA		NA		NA		NA	
cis-1,2 Dichloroethene	NA		NA		NA		NA		NA		NA		NA		NA	
trans-1,2-Dichloroethene	NA		NA		NA		NA		NA		NA		NA		NA	
Chloroform	5.0	U	5.0	U	5.0	υ	5.0	υ	NA		NA		NA		NA	
1,2 Dichloroethane	5.0	υ	5.0	U	5.0	υ	5.0	U	NA		NA		NA		NA	
2 Butanone	20	υ	20	U	20	υ	20	U	50	U	20	U	20	U	20	υ
1,1,1-Trichloroethane	5.()	U	5.0	U	5.0	U	5.0	U	NA		NA		NA		NA	
Carbon tetrachloride	50	U	5.0	U	5.0	U	5.0	U	NA		NΛ		NΛ		NA	
Bromodichloromethane	5.0	υ	5.0	υ	5.0	U	5.0	U	NA		NA		NA		NA	
1,2 Dichloropropane	5.0	U	5.0	U	5.0	U	5.0	U	NA		NA		NA		NA	
cis-1,3 Dichloropropene	5.0	U	5.0	υ	5.0	U	5.0	υ	NA		NA		NA		NA	
Trichloroethene	5.0	U	5.0	U	5.0	U	5.0	υ	NA		5.0	υ	5.0	U	5.0	U
Dibromochloromethane	5.0	U	5.0	U	5.0	U	5.0	U	NA		NA		NA		NA	
1,1,2-Trichloroethane	5.0	U	5.0	U	5.0	U	5.0	υ	NA		NA		NA		NA	
Benzene	5.0	U	5.0	U	5.0	U	5.0	U	12	U	5.0	U	5.0	U	5.0	U
trans-1,3-Dichloropropene	5.0	υ	5.0	υ	5.0	บ	5.0	U	NA		NA		NA		NA	
Bromoform	5.0	U	5.0	U	5.0	U	5.0	U	NA		NA		NA		NA	
4 Methyl-2 pentanone	20	U	20	U	20	U	3.2	3	170	j	20	บ	20	U	20	บ
2 Hexanone	20	U	20	U	20	U	20	Ü	NA		NA		NA		NA	
Tetrachloroethene	5.0	U	5.0	U	5.0	U	5.0	U	NA		NA		NA		NA	
1,1,2,2-Tetrachloroethane	5.0	U	5.0	U	5.0	U	5.0	U	NA		NA		NA		NA	
Toluene	5.0	U	5.0	U	5.0	υ	5.0	U	12	U	5.0	U	5.0	Ų	5.0	υ
Chlorobenzene	5.0	υ	5.0	υ	5.0	ប	5.0	บ	NA		5.0	υ	5.0	υ	5.0	υ
Ethylbenzene	5.0	U	5.0	U	5.0	U	5.0	U	12	U	5.0	U	5.0	U	5.0	υ
Styrene	5.0	U	5.0	U	5.0	U	5.0	U	NA		NA		NA		NA	
Xylenes (total)	5.0	U	5.0	U	5.0	U	5.0	U	12	U	5.0	บ	5.0	U	5.0	U
Vinyl acetate	10	υ	10	U	10	U	10	U	NA		NA		NA		NA	

U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

J - This result should be considered a quantitative estimate.

NA - Not Analyzed

Summary of Semivolatile Organics Data for Deep Off-Site Fround Water Greiner's Lagoon Site, Fremont Ohio

Sample Location	n GL-WS-MW	/-1	GL-WS-MW-1	DUP	GL-WS-M	W-2	GL-WS-MV	V-3	MW-1		MW-2		MW-3	
Date collected	7/24/96		7/24/96		7/23/9	6	7/24/96		11/10/98		11/10/98		11/10/9	8
Semivolatile Organics														
Phenol	10	U	10	U	10	U	10	U	2.8	j	10	U	10	U
bis(2-Chloroethyl) ether	10	U	10	U	10	U	10	U	NA		NA		NA	
2-Chlorophenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Methylphenol	10	U	10	U	10	ប	10	U	10	U	10	U	10	U
4-Methylphenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U
N-Nitrosodi-n-propylamine	10	U	10	' ប	10	U	10	U	10	U	10	U	10	U
Hexachloroethane	10	U	10	U	10	U	10	U	NA		NA		NA	
Nitrobenzene	10	U	10	U	10	U	10	U	NA		NA		NA	
Isophorone	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Nitrophenol	10	U	10	U	10	ប	10	U	NA		NA		NA	
bis(2-Chloroethoxy)methane	10	U	10	U	10	ប	10	U	NA		NA		NA	
Naphthalene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Chloroaniline	10	U	10	U	10	U	10	U	NA		NA		NA	
Hexachlorobutadiene	10	U	10	U	10	U	10	U	NA		NA		NA	
4-Chloro-3-methylphenol	10	ប	10	U	10	U	10	U	10	U	10	U	10	U
2-Methylnaphthalene	10	U	10	· U	10	U	10	U	10	U	10	U	10	U
Hexachlorocyclopentadiene	50	U	50	U	50	U	50	U	NA		NA		NA	
2-Chloronaphthalene	10	U	10	· U	10	U	10	U	NA		NA		NA	
2-Nitroaniline	50	U	50	U	50	U	50	U	NA		NA		NA	
Dimethyl phthalate	10	U	10	U	10	U	10	U	NA		NA		NA	
Acenaphthylene	10	U	10	U	10	U	10	U	NA		NA		NA	
3-Nitroaniline	50	U	50	U	50	U	50	U	NA		NA		NA	
4-Nitrophenol	50	U	· 50	U	50	U	50	U	50	U	50	U	50	U
Dibenzofuran	10	U	10	U	10	U	10	U	NA		NA		NA	
Diethyl phthalate	10	U	10	U	10	U	10	U	NA		NA		NA	
4-Chlorophenyl phenyl ether	10	U	10	U	10	U	10	U	NA		NA		NA	
Fluorene	10	U	10	U	10	U	10	U	NA		NA		NA	
Acenaphthene	10	U	10	ប	10	U	10	U	10	U	10	U	10	U
4-Nitroaniline	50	U	50	U	50	U	50	U	NA		NA		NA	
N-Nitrosodiphenylamine	10	U	10	U	10	U	10	U	NA		NA		NA	
4-Bromophenyl phenyl ether	10	U	10	U	10	U	10	U	NA		NA		NA	
Hexachlorobenzene	10	U	10	U	10	U	10	U	NA		NA		NA	

Table A-16 (Con't)
Summary of Semivolatile Organics Data for Deep Off-Site Ground Water
Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-WS-M	W-1	GL-WS-MW-1	DUP	GLWS-MV	N-2	GL-WS-M	W-3	MW-1		MW-2		MW-3	
Date collected	7/24/9	6	7/24/96		7/23/96	•	7/24/9	6	11/10/98		11/10/98		11/10/98	8
Semivolatile Organics						-								
Pentachlorophenol	50	U	50	บ	50	U	5 0	U	10	U	10	U	10	U
Phonanthrone	10	U	10	U	10	U	10	U	NA		NA		NA	_
Anthracene	10	U	10	U	10	U	10	U	NA		NA		NA	
Carbazole	10	U	10	U	10	U	10	U	NA		NA		NA	
Di-n-butyl phthalate	10	U	10	U	10	U	10	U	NA		NA		NA	
Fluoranthene	10	U	10	' υ	10	U	10	U	10	U	10	υ	10	U
Pyrene	10	U	10	U	10	ប	10	U	10	U	10	U	10	Ū
Butyl benzyl phthalate	10	U	10	υ	10	U	10	U	NA		NA		NA	_
Benzo(a)anthraceno	10	U	10	U	10	U	10	U	NA		NA		NA	
Chrysene	10	U	10	υ	10	U	10	U	NA		NA		NA	
bis(2-Ethylhexyl) phthalate	10	υ	2.3	1	2.2	ī	7.4	1	7.9	В	6.9	В	15	В
Di n octyl phthalate	10	U	10	Ú	10	Ú	10	ΰ	NA		NA		NA	
Benzo(b)fluoranthene	10	U	10	υ	10	U	10	U	NA		NA		NA	
Benzo(k)fluoranthene	10	U	10	U	10	υ	10	U	NA		NA		NA	
Benzo(a)pyrene	10	U	10	U	10	U	10	U	NA		NA		NA	
Indeno(1,2,3 cd)pyrene	10	U	10	U	10	U	10	U	NA		NA		NA	
Dibenz(a,h)anthracene	10	U	10	U	10	υ	10	U	NA		NA		NA	
Benzo(ghi)perylene	10	U	10	U	10	U	10	U	NA		NA		NA	
1,3 Dichlorobenzene	10	U	10	U	10	U	10	U	NA		NA		NA	
1,4 Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2,2'-Oxybis(1-Chloropropane)	10	υ	10	U	10	U	10	υ	NA		NA		NA	
2,4-Dimethylphenol	10	U	10	U	10	U	10	U	NA		NA		NA	
2,4-Dichlorophenol	10	U	10	U	10	U	10	U	NA		NA		NA	
1,2,4-Trichlorobenzene	10	U	10	υ	10	U	10	U	10	U	10	U	10	U
2,4,6-Trichlorophenol	10	U	10	υ	10	U	. 10	U	NA		NA		NA	
2,4,5-Trichlorophenol	10	U	10	U	10	U	10	U	NA		NA		NA	
2,6-Dinitrotoluene	10	U	10	U	10	U	10	U	NA		NA		NA	
2,4-Dinitrophenol	50	υ	50	U	50	U	50	U	NA		NA		NA	
2,4-Dinitrotoluene	10	ប	10	U	10	υ	10	U	10	U	10	Ŭ	10	U
4,6-Dinitro-2-methylphenol	50	U	50	υ	50	U	50	U	NA		NA		NA	
3,3'-Dichlorobenzidine	50	υ	50	U	50	U	50	U	NA		NA		NA	

J - This result should be considered a quantitative estimate.

B - This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration.

U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

NA - Not Analyzed.

Summary of Pesticides and PCBs Data for Deep Off-Site Ground Water Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-WS-	MW-1	GL-WS-M	W-1 DUP	GL-WS	-MW-2	GL-WS	-MW-3
Date collected	7/24	/96	7/24	/96	7/23	/96	7/24	/96
Pesticides								
alpha-BHC	0.050	U	0.050	UJ	0.050	ប្យ	0.050	UJ
beta-BHC	0.050	U	0.050	ប្យ	0.050	ប្យ	0.050	UJ
delta-BHC	0.050	U	0.050	ប្យ	0.050	ប្យ	0.050	UJ
gamma-BHC (Lindane)	0.050	U	0.050	UJ	0.050	ប្យ	0.050	ប្យ
Heptachlor	0.050	U	0.050	UJ	0.050	υj	0.050	ប្យ
Aldrin	0.050	U	0.050	UJ	0.050	υj	0.050	UJ
Heptachlor epoxide	0.050	U	0.050	UJ	0.050	υj	0.050	UJ
Endosulfan I	0.050	U	0.050	ÚJ	0.050	IJ	0.050	ÚĴ
Dieldrin	0.050	U	0.050	Ú	0.050	Ú	0.050	Ú
Endrin	0.050	U	0.050	UJ	0.050	Ú	0.050	ÚĴ
Endosulfan II	0.050	U	0.050	Uj	0.050	υj	0.050	Ú
Endosulfan sulfate	0.050	U	0.050	ຫຼັ	0.050	υj	0.050	υj
Methoxychlor	0.25	U	0.25	UJ	0.25	υj	0.25	UJ
Endrin ketone	0.050	U	0.050	ប្យ	0.050	υj	0.050	ប្យ
Endrin aldehyde	0.050	U	0.050	UJ	0.050	IJ	0.050	ហ្វ
alpha-Chlordane	0.050	U	0.050	ប្យ	0.050	ÚĴ	0.050	UJ
gamma-Chlordane	0.050	U	0.050	ប្យ	0.050	υJ	0.050	UJ
4,4'-DDE	0.050	U	0.050	ប្យ	0.050	IJ	0.050	UJ
4,4'-DDD	0.050	U	0.050	ហ្វ	0.050	UJ	0.050	ប្យ
4,4'-DDT	0.050	U	0.050	UJ	0.050	ប្យ	0.050	UJ
Toxaphene	2.0	U	2.0	UJ	2.0	UJ	2.0	UJ
Aroclor 1016	1.0	U	1.0	υj	1.0	UJ	1.0	ប្យ
Aroclor 1221	1.0	U	1.0	ហ្វ	1.0	UJ	1.0	υj
Aroclor 1232	1.0	U	1.0	Ú	1.0	UJ	1.0	UJ
Aroclor 1242	1.0	U	1.0	ហ្វ	1.0	υj	1.0	υj
Aroclor 1248	1.0	U	1.0	υj	1.0	υj	1.0	ÚĴ
Aroclor 1254	1.0	U	1.0	υj	1.0	ຫຼັ	1.0	ÚJ
Aroclor 1260	1.0	Ū	1.0	ຫຼັ	1.0	υj	1.0	UJ

U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

UJ - This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate.

Table A-18
Summary of Metals Data for Deep Off-Site Ground Water
Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-WS-MI	W-1	GL-WS-MW-1	DUP	GL-WS-M	W-2	GL-WS-M	W-3	MW-1		MW-2		MW-3	
Date Collected	7/24/90	5	7/24/96		7/23/9	5	7/24/9	6	11/10/98		11/10/98		11/10/98	
Metals														
Antimony	0.010	U	0.010	U	0.010	υ	0.010	U	0.010	U	0.010	U	0.010	υ
Arsonic	0.010	U	0.010	U	0.010	U	0.010	U	0.010	UJ	0.010	UJ	0.010	U
Boryllium	0.005	U	0.005	U	0.005	บ	0.005	U	0.0050	U	0.0050	U	0.0050	U
Cadmium	0.002	U	0.002	U	0.002	U	0.002	U	0.0020	U	0.0020	U	0.0020	υ
Chromium	0.005	U	0.005	U	0.005	U	0.005	U	0.0050	U	0.0050	U	0.0050	U
Cohalt	0.050	U	0.050	U	0.050	U	0.050	U	NA		NA		NA	
Copper	0.025	U	0.025	U	0.025	U	0.025	U	0.025	Uj	0.025	UJ	0.025	UJ
Lead	0.003	U	0.003	บ	0.004		0.0044		0.0052		0.0099		0.014	
Morcury	0.0002	υ	0.0002	U	0.0002	U	0.0002	U	0.00020	U	0.00020	U	0.00020	U
Nickol	0.040	U	0.040	υ	0.040	U	0.040	U	0.040	U	0.040	U	0.040	U
Selenium	0.005	UJ	0.005	UJ	0.005	UJ	0.005	υj	0.0050	UJ	0.0050	UJ	0.0050	UJ
Silver	0.005	Ú	0.005	U	0.005	Ű	0.005	U	0.0050	U	0.0050	U	0.0050	U
Thallium	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U
Zinc	0.050	U	0.050	U	0.050	U	0.050	υ	0.055		0.080		0.061	

U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

UJ - This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitative estimate.

Table A-19
Summary of Volatile Organics Data for Surface Water
Greiner's Lagoon Site, Fremont Ohio

SAMPLE LOCATION:	GL-WS-S	5W-1	GL-WS-SW	-1DUP	GL-WS-	SW-2	GL-WS-	SW-3	GL-WS-	5W-4
DATE COLLECTED:	7/31/	97	7/31/9	97	7/31/	97	7/31/	97	7/31/	97
Volatile Organics								-		
Acetone	20	U	20	U	20	U	33	U	20	U
2-Butanone	20	U	20	U	20	U	33	U	20	U
Benzene	5.0	U	5.0	U	5.0	U	8.3	U	5.0	U
4-Methyl-2-pentanone	5.0	U	5.0	U	5.0	U	8.3	U	5.0	U
Toluene	20	U	20	U	20	U	33	U	20	U
Ethylbenzene	5.0	U	5.0	U	5.0	U	8.3	U	5.0	U
Xylene (total)	5.0	U	5.0	U	5.0	U	8.3	U	5.0	U

l results presented in units of ug/L.

U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

Table A-20
Summary of Semivolatile Organics Data for Surface Water
Greiner's Lagoon Site, Fremont Ohio

SAMPLE LOCATION:	GL-WS-	5W-1	GL-WS-SW-	1DUP	GL-WS-9	5W-2	GL-WS-S	5W-3	GL-WS-9	W-4
DATE COLLECTED:	7/31/	97	7/31/9	7	7/31/	97	7/31/	97_	7/31/	97
Semivolatile Organics		10 11								
bis(2-Ethylhexyl) phthalate	10	U	8.4	J	10	U	10	U	10	U
1,2-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U
Fluoranthene	10	U	10	U	10	U	10	U	10	U
Isophorone	10	U	10	U	10	U	10	U	10	U
2-Methylnaphthalene	10	U	10	U	10	U	10	U	10	U
2-Methylphenol	10	U	10	U	10	U	10	ប្យ	10	U
4-Methylphenol	10	U	10	U	10	U	10	UJ	10	U
Naphthalene	10	U	10	Ľ	10	U	10	U	10	U
Phenol	10	U	10	U	10	U	10	UJ	10	U
1,2,4-Trichlorobenzene	10	U	10	U	10	U	10	U	10	U

All results presented in units of ug/L.

- J This result should be considered a quantitative estimate.
- U This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.
- UJ This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitive estimate.

Table A-21
Summary of Metals Data for Surface Water
Greiner's Lagoon Site, Fremont Ohio

SAMPLE LOCATION	GL-WS-S	W-1	GL-WS-SW-1	DUP	GL-WS-ST	<i>N</i> -2	GL-WS-S	W-3	GL-WS-SV	V-4
DATE COLLECTED:	7/31/9	7	7/31/97		7/31/9	7	7/31/9	7	7/31/97	7
Metals										
Antimony	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U
Arsenic	0.010	UJ	0.010	UJ	0.010	UJ	0.010	UJ	0.010	UJ
Beryllium	0.0050	U	0.0050	U	0.0050	U	0.0050	U	0.0050	Ū
Cadmium	0.0020	U	0.0020	U	0.0020	U	0.0020	U	0.0020	U
Chromium	0.0050	U	0.0050	U	0.0050	U	0.0050	U	0.0050	U
Cobalt	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
Copper	0.025	U	0.025	U	0.025	U	0.025	U	0.025	U
Lead	0.0030	U	0.0061	J	0.0030	U	0.0030	U	0.0030	U
Mercury	0.00020	U	0.00020	U	0.00020	U	0.00020	U	0.00020	U
Nickel	0.040	U	0.040	U	0.040	U	0.040	U	0.040	U
Selenium	0.0050	UJ	0.0050	UJ	0.0050	UJ	0.0050	UJ	0.0050	UJ
Silver	0.0050	U	0.0050	U	0.0050	U	0.0050	U	0.0050	U
Thallium	0.010	UJ	0.010	UJ	0.010	UJ	0.010	UJ	0.010	UJ
Zinc	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U

All results presented in units of ug/L.

U - This compound/analyte was analyzed but not detected. The numerical value represents the quantitation/detection limit of the compound/analyte.

UJ - This compound/analyte was analyzed but not detected. The numerical value that represents the quantitation limit of the compound/analyte is a quantitive estimate.

Table A-22
Summary of Volatile Organics Data for Sediment
Greiner's Lagoon Site, Fremont Ohio

SAMPLE LOCATION:	GL-SS-SED-1		GL-SS-SED-1DUP		GL-SS-SED-2		GL-SS-SED-3		GL-SS-SED-4	
DATE COLLECTED:	7/31/97		7/31/97		7/31/97		7/31/97		7/31/97	
Volatile Organics				-					<u> </u>	
Acetone	26	U	26	U	30	U	2 6	U	74	J
Benzene	6.5	U	6.6	U	7.5	U	6.4	U	6.9	U
2-Butanone	26	U	26	ſ.	30	U	26	U	17	J
Ethylbenzene	6.5	U	6.6	U	7.5	U	6.4	U	6.9	U
4-Methyl-2-pentanone	26	U	26	U	30	U	2 6	U	28	U
Toluene	6.5	U	6.6	U	7.5	U	6.4	U	6.9	U
Xylene (total)	6.5	U	6.6	U	7.5	U	6.4	U	6.9	U

All values presented in units of ug/kg

J - This result should be considered a quantitative estimate.

U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

Table A-23 Summary of Semivolatile Organics Data for Sediment Greiner's Lagoon Site, Fremont Ohio

SAMPLE LOCATION:	GL-SS-SE	D-1	GL-SS-SED-1	DUP	GL-SS-SE	D-2	GL-SS-SE	D-3	GL-SS-SE	D-4
DATE COLLECTED:	7/31/9	97	7/31/97	·	7/31/9	97	7/31/9	7	7/31/9	7
Semivolatile Organics										_
bis(2-Ethylhexyl) phthalate	430	U	440	U	60	J	430	U	450	U
1,2-Dichlorobenzene	430	U	440	U	500	U	430	U	450	U
Fluoranthene	430	U	440	U	500	U	430	U	450	U
Isophorone	430	U	440	U	500	U	430	U	450	U
2-Methylnaphthalene	430	U	440	U	500	U	430	U	450	U
2-Methylphenol	430	U	440	U	500	U	430	U	450	U
4-Methylphenol	430	U	440	U	500	U	430	U	4 50	U
Naphthalene	430	U	440	U	500	U	430	U	45 0	U
henol	430	U	440	U	500	U	430	U	45 0	U
1,2,4-Trichlorobenzene	430	U	440	U	500	บ	430	U	450	U

All values presented in units of ug/kg

J - This result should be considered a quantitative estimate.

U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

Table A-24
Summary of Metals Data for Sediment
Greiner's Lagoon Site, Fremont Ohio

SAMPLE LOCATION:	GL-SS-S	ED-1	GL-SS-SED-	1DUP	GL-SS-SI	ED-2	GL-SS-SI	ED-3	GL-SS-SE	D-4
DATE COLLECTED:	7/31/	97	7/31/9	7	7/31/	97	7/31/	97 _	7/31/9	9 7
Metals										
Antimony	1.3	UJ	1.3	UJ	1.5	UJ	1.3	UJ	1.4	UJ
Arsenic	4.0	J	3.3	J	3.9	J	4.2	J	6.4	J
Beryllium	0.65	U	0.66	U	0.75	U	0.64	U	0.69	บ
Cadmium	0.26	U	0.26	ľ	0.30	U	0.26	U	0.28	U
Chromium	6.6		4.5		9.8		6.2		9.0	
Copper	8.1	J	8.3	J	11.0	J	13.4	J	15.6	J
Lead	4.6	J	4.5	J	8.4	J	6.3	J	10.3	J
Mercury	0.13	U	0.13	U	0.15	U	0.13	U	0.14	ប
Nickel	8.6		8.1		15.5		12.7		16.7	
Selenium	0.65	IJ	0.66	UJ	1.5	UJ	0.64	ប្យ	1.4	UJ
Silver	0.65	U	0.66	U	0.75	U	0.64	U	0.69	U
Thallium	1.3	U	1.3	U	1.5	U	1.3	U	1.4	U
Zinc	33.5		28.1		52.3		39.0		77.2	

All values presented in units of mg/kg

- J This result should be considered a quantitative estimate.
 at a similar concentration.
- U This compound/analyte was analyzed but not detected. The numerical value represents the quantitation/detection limit of the compound/analyte.
- UJ This compound/analyte was analyzed but not detected. The numerical value that represents the quantitation limit of the compound/analyte is a quantitive estimate.

95% Upper Confidence Limit Calculations for Volatile Organia. Data for On-Site Soil 0-14 Feet Greiner's Lagoon Site, Fremont Olio

Sample Location	GL-SS-S	M-1	GL-SS-SI	M-2	GL-SS-S	M-3	GL-SS-SI	VI-4	GL-SS-SM-5 AVG DUP	GL-SS-SN	√ f -5	GL-SS-SI	VI-6	GL-SS-SN	<i>I</i> -6	GL-SS-S	M-7
Sample Depth	5'-7'		3'-5'		5'-7'		5'- <i>7</i> '		5'-7'	11'-13'	ı	5'- 7 '		11'-13'		3'-5'	
Volatile Organics																	
Acetone	2200	В	1100	В	1500	В	7100	В	12800	32000		5900	В	27000		4500	В
2-Butanone	910	J	1500	U	1900	J	16500	U	18250	5000	U	1550	U	3150	U	3050	ι
Trichloroethene	450	U	375	U	500	Ū	4150	U	4400	1300	U	385	U	800	U	1400	J
Benzene	860	J	350	J	500	U	5600	J	5200	1300	U	385	U	800	U	4300	•
4-Methyl-2-pentanone	8700	J	6800	J	8100		28000	J	63000	55000		23000		35000		50000	J
2-Hexanone	1800	U	1500	U	2100	U	16500	U	18250	5000	U	1550	U	3150	U	3050	Ù
1,1,2,2-Tetrachloroethane	470	J	375	U	500	Ŭ	4150	U	4400	1300	U	385	U	800	U	750	U
Toluene	12000		11000		1300		140000		19800	1300	U	2100		800	U	43000	
Ethylbenzene	7000		8100		500	U	76000	•	13350	1300	U	730	J	800	U	10000	
Styrene	450	U	3800		500	U	4150	U	4400	1300	U	385	U	800	U	750	υ
Xylenes (total)	34000		38000		2000		340000		81000	1300	U	3500		800	U	51000	

I OC TRANSFORMED DATA					
	$I \sim$	TD A	NICECOL	(CD	T A T A

Sample Location	GL-SS-SM-1	GL-SS-SM-2	GL-SS-SM-3	GL-SS-SM-4	GL-SS-SM-5 AVG DUP	GL-SS-SM-5	GL-SS-SM-6	GL-SS-SM-6	GL-SS-SM-7
Sample Depth	5'- <i>7</i> '	3'-5'	5'- <i>7</i> '	5'- 7 '	5'-7'	11'-13'	5'- 7'	11'-13'	3'-5'
Volatile Organics									
Acetone	7.70	7.00	7.31	8.87	9.46	10.37	8.68	10.20	8.41
2-Butanone	6.81	7.31	7.55	9.71	9.81	8.52	7.35	8.06 ·	8.02
Trichloroethene	6.11	5.93	6.21	8.33	8.39	7.17	5.95	6.68	7.24
Benzene	6.76	5.86	6.21	8.63	8.56	7.17	5.95	6.68	8.37
4-Methyl-2-pentanone	9.07	8.82	9.00	10.24	11.05	10.92	10.04	10.46	10.82
2-Hexanone	7.50	7.31	7.65	9.71	9.81	8.52	7.35	8.06	8.02
1,1,2,2-Tetrachloroethane	6.15	5.93	6.21	8.33	8.39	7.17	5.95	6.68	6.62
Toluene	9.39	9.31	7.17	11.85	9.89	7.17	7.65	6.68	10.67
Ethylbenzene	8.85	9.00	6.21	11.24	9.50	7.17	6.59	6.68	9.21
Styrene	6.11	8.24	6.21	8.33	8.39	7.17	5.95	6.68	6.62
Xylenes (total)	10.43	10.55	7.60	12.74	11.30	7.17	8.16	6.68	10.84

All results are reported in units of ug/kg.

All U values represent one-half the detection limit.

95% Upper Confidence Limit Calculations for Volatile Organics Data for On-Site Soil 0-14 Feet Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-SS-S		GL SS-SM-7 A	VG DUP	GL-SS-SI	VI-8	CL-SS-SI	M-8	GL-SS-SN	1-8	GL-SS-SN		GL-SS-SI	M.9	GL-SS-S	
Sample Depth	7-9	· 	11'-13'		0,-1,		3'-5'		7'-9'		11'-13'		4'-6'		6'-8'	
Volatile Organics																
Acetone	16000		3280	jВ	30500	U	21000	В	7100	В	6800	В	12.5	U	12	j
2 Butanone	1550	U	38.8	J	30500	U	29500	U	7500	U	3000	U	12.5	บ	2.5	J
Trichloroethene	385	U	16.55	U	9500	J	7700	J	2100	J	750	U	3.05	U	3.1	ι
Benzene	385	U	16.55	U	27000		25000		5200		880	J	3.05	U	3.1	t
4-Methyl-2-pentanone	28000		253	jΒ	100000	J	140000		45000	J	18000	Ţ	12.5	U	12.5	ι
2-Hexanone	1550	U	66.25	υ	30500	Ų	29500	U	7500	U	3000	U	12.5	U	12.5	ι
1,1,2,2-Tetrachloroethane	385	U	16.55	U	7500	U	7500	U	1850	U	750	U	3.05	U	3.1	i.
Toluene	1200		27.05	JU	330000		290000		81000		11000		3.05	U	3.1	L
Ethylbenzene	385	U	16.55	U	97000		110000		30000		5000		3.05	U	3.1	ι
Styrene	385	U	16.55	U	7500	U	7500	U	1850	U	750	U	3.05	U	3.1	ι
Xylenes (total)	560	Ţ	22.05	JU	460000		520000		150000		24000		3.05	Ų	3.1	L.
LOG TRANSFORMED DATA								-	·							
Sample Location	GL SS S			L-SS-SM-7 AVG DUP GL		N-8	GL-SS-SN	M-8	GL-SS-SN	1-8	GL-SS-SN		GL-SS-S	M-9	GL-SS-S	
Sample Depth	7' 9'		11'-13'	11'-13'			3'-5'		7'-9'		11'-13'		4'-6'		6' 8'	<u>'</u>
Volatile Organics																
Acetone	9.68		8.10		10.33		9.95		8.87		8.82		2.53		2 48	
2-Butanone	7.35		3.66		10.33		10.29		8.92		8.01		2.53		0.92	
Trichloroethene	5.95		2.81		9.16		8.95		7.65		6.62		1.12		1.13	
Benzene	5.95		2.81		10.20		10.13		8.56		6.78		1.12		1.13	
4-Methyl-2-pentanone	10.24		5.53	•	11.51		11.85		10.71		9.80		2.53		2.53	
2-Hexanone	7.35		4.19		10.33		10.29		8.92		8.01		2.53		2.53	
1,1,2,2-Tetrachloroethane	5.95		2.81		8.92		8.92		7.52		6.62		1.12		1.13	
Toluene	7.09		3.30		12.71		12.58		11.30		9.31		1.12		1.13	
Ethylbenzene	5.95		2.81		11.48		11.61		10.31		8.52		1.12		1.13	
emynenzene																
Styrene	5.95		2.81		8.92		8.92		7.52		6.62		1.12		1.13	

All results are reported in units of ug/kg.
All U values represent one-half the detection limit.

95% Upper Confidence Limit Calculations for Volatile Organics Data for On-Site Soil 0-14 Feet Greiner's Lagoon Site, Fremont Olio

Sample Location	GL-SS-S	M-9	GL-SS-S	M-10	GL-SS-SI	VI-10	GL-SS-SN	1 -10	GL-SS-	SS	GL-SS-S	B-1	GL-SS-SI	B-2	GL-SS-S	B-3	GL-SS-SB-4 AVC	DU
Sample Depth	12'-14	4'	4'-6'		6'-8'		12'-14	,	0'-1'		6-8		6-8		6-8		8-10	
Volatile Organics					,													
Acetone	33		12.5	U	71		36		1300	В	1500	U	8400		63	J	23000	
2-Butanone	7.5	J	12.5	U	4.9	J	4.0	J	2600	U	1500	U	3050	U	11.5	Ü	2050	ι
Trichloroethene	3.15	U	3.1	U	3	U	3.15	Ū	650	U	375	U	75 0	U	2.9	U	515	τ
Benzene	3.15	U	3.1	U	4.9	J.	3.15	U	650	U	375	U	75 0	U	3.9	J	515	Ţ
4-Methyl-2-pentanone	7.9	J	12.5	Ŭ	5.6	J١	3.9	J	2600	U	10000		50000		11.5	U	34500	
2-Hexanone	5 .3	J	12.5	U	12	U	12.5	U	2600	U								
1,1,2,2-Tetrachloroethane	3.15	U	3.1	U	. 3	U	3.15	U	650	U								
Toluene	3.15	U	3.1	U	3	U	3.15	U	1300		375	U	750	U	2.9	U	515	ι
Ethylbenzene	3.15	U	3.1	U	3	U	3.15	U	3500	•	375	U	750	U	2.9	U	515	ι
Styrene	3.15	U	3.1	U	3	U	3.15	U	650	U	375	U	750	U	2.9	U	515	J
Xylenes (total)	3.15	U	3.6	J	3	U	3.15	U	26000		375	U	750	U	2.9	U	515	Ţ

Sample Location	GL-SS-SM-9	GL-SS-SM-10	GL-SS-SM-10	GL-SS-SM-10	GL-SS-SS	GL-SS-SB-1	GL-SS-SB-2	GL-SS-SB-3	GL-SS-SB-4 AVG DUI
Sample Depth	12'-14'	4'-6'	6'-8'	12'-14'	0'-1'	6-8	6-8	6-8	8-10
Volatile Organics		· 							
Acetone	3.50	2.53	4.26	3.58	7.17	7.31	9.04	4.14	10.04
2-Butanone	2.01	2.53	1.59	1.39	7.86	7.31	8.02	2.44	7.63
Trichloroethene	1.15	1.13	1.10	1.15	6.48	5.93	6.62	1.06	6.24
Benzene	1.15	1.13	1.59	1.15	6.48	5.93	6.62	1.36	6.24
4-Methyl-2-pentanone	2.07	2.53	i .72	1.36	7.86	9.21	10.82	2.44	10.45
2-Hexanone	1.67	2.53	2.48	2.53	7.86				
1,1,2,2-Tetrachloroethane	1.15	1.13	1.10	1.15	6.48				
Toluene	1.15	1.13	1.10	1.15	7.17	5.93	6.62	1.06	6.24
Ethylbenzene	1.15	1.13	1.10	1.15	8.16	5.93	6.62	1.06	6.24
Styrene	1.15	1.13	1.10	1.15	6.48	5.93	6.62	1.06	6.24
•									

1.15

10.17

5.93

6.62

6.24

1.06

Notes:

Xylenes (total)

All results are reported in units of ug/kg.

LOG TRANSFORMED DATA

All U values represent one-half the detection limit.

1.15

1.28

1.10

95% Upper Confidence Limit Calculations for Volatile Organics Data for On-Site Soil 0-14 Feet Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-SS-SB-5 (N	√W-2)	GL-SS-SI	3-6	GI_SS-9	B-7	CL-SS-S	5B-8	GL/SS-9	B-9	GL SS S	B-10	GL-SS-SB	-11	GL-SS-SB-	-12
Sample Depth	6-8		4-6		6-8		4-6	5	4-6	1	6-8		0-2		6-8	
Volatile Organics																
Acetone	13	J	11.5	U	10	1	48	1	18	1	14	1	23000	U	5800	1
2-Butanone	12.5	Ú	11.5	บ	12	ΰ	12	ΰ	12	ΰ	12	ύ	23000	Ü	2050	ύ
Trichloroethene	3.1	U	2.9	υ	3.05	U	3	U	3.05	Ü	3.05	U	6000	Ū	500	Ü
Benzene	4.0	J	2.9	υ	3.05	U	3	U	6.3		28		6000	Ü	500	Ū
4-Methyl-2-pentanone	12.5	Ú	11.5	U	12	U	7.7	В	12	U	6.3	ī	40000	В	40000	_
2-Hexanone												,				
1,1,2,2 Tetrachloroethane																
Toluene	3.1	U	2.9	U	3.05	U	3	υ	3.05	U	3.05	U	85000		500	U
Ethylbenzene	3.1	U	2.9	υ	3.05	U	3	U	3.05	Ú	3.05	υ	48000		500	Ū
Styrene	3.1	U	2.9	U	3.05	U	3	U	3.05	U	3.05	U	6000	U	500	U
Xylenes (total)	3.1	υ	2.9	U	3.05	U	3	U	3.05	tı	3.05	U	250000		500	U
LOG TRANSFORMED DATA					•		-									
Sample Location	GL-SS-SB-5 (N	/W-2)	GL-SS-SE	3-6	GL-SS-S	B-7	GL-SS-S	5B-8	GL SS-9	SB-9	GL-SS-S	B-10	GL-SS-SB	-11	GL 55 5B-17	2
Sample Depth	6-8		4-6		6-8		4-6		4-6		6.8		0.2	•	6-8	
Volatile Organics																
Acetone	2.56		2.44		2.30		3.87		2.89		2.64		10.04		8.67	
2-Butanone	2.53		2.44		2.48		2.48		2.48		2.48		10.04		7.63	
Trichloroethene	1.13		1.06		1.12		1.10		1.12		1.12		8.70		6.21	
Benzene	1.39		1.06		1.12		1.10		1.84		3.33		8.70		6.21	
4-Methyl-2-pentanone	2.53		2.44	•	2.48		2.04		2.48		1.84		10.60		10.60	
2-Hexanone	_								_				-			
1,1,2,2-Tetrachloroethane																
Toluene	1.13		1.06		1.12		1.10		1.12		1.12		11.35		6.21	
Estable	1.13		1.06		1.12		1.10		1.12		1.12		10.78		6.21	
Ethylbenzene																
Styrene	1.13		1.06		1.12		1.10		1.12		1.12		8.70		6.21	

All results are reported in units of ug/kg.

All U values represent one-half the detection limit.

95% Upper Confidence Limit Calculations for Volatile Organia. Data for On-Site Soil 0-14 Feet Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-SS-SB-13 AV	G DUP	MW-1	.3
Sample Depth	6-8		8-10'	
Volatile Organics				
Acetone	25.05	J	6400	В
2-Butanone	12	Ū	1500	U
Trichloroethene	3	U	375	U
Benzene	3	U	375	U
4-Methyl-2-pentanone	12	U	1500	U
2-Hexanone				
1,1,2,2-Tetrachloroethane				
Toluene	3	U	375	U
Ethylbenzene	3	U	375	U
Styrene	3	U		
Xylenes (total)	3	U	375	໌ປ

LOG TRANSFORMED DATA

Sample Location	GL-SS-SB-13 AVG DUP	MW-13		Std				95%	Max	Lower of Max
Sample Depth	6-8	8-10'	Mean	Dev	Ν	N-1	H stat	UCL	Conc	Conc vs. UCL
Volatile Organics		<u>, , , , , , , , , , , , , , , , , , , </u>								
Acetone	3.22	8.76	6.60	3.01	36	35	5.250	9.9E+05	32000	32000
2-Butanone	2.48	7.31	5.79	3.13	36	35	5.441	7.8E+05	1900	1900
Trichloroethene	1.10	5.93	4.58	3.01	36	35	5.244	1.3E+05	9500	9500
Benzene	1.10	5.93	4.84	3.09	36	35	5.378	2.5E+05	27000	27000
4-Methyl-2-pentanone	2.48	7.31	6.90	3.94	36	35	6.722	2.1E+08	140000	140000
2-Hexanone			6.60	2.94	22	21	5.731	2.2E+06	5.3	5.3
1,1,2,2-Tetrachloroethane			5.25	2.88	22	21	5.625	4.0E+05	470	470
Toluene	1.10	5.93	5.59	4.12	36	35	7.008	1.7E+08	330000	330000
Ethylbenzene	1.10	5.93	5.29	3.82	36	35	6.528	2.0E+07	110000	110000
Styrene	1.10		4.58	3.07	35	34	5.341	1.8E+05	3800	3800
Xylenes (total)	1.10	5.93	5.90	4.47	36	35	7.569	2.4E+09	520000	520000

Notes:

All results are reported in units of ug/kg.
All U values represent one-half the detection limit.

95% Upper Confidence Limit Calculations for Semivolatile Organics Data for On-Site Soil 0-14 Feet Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-SS-SN	A-1	G L-98-\$ N	A-2	GL-SS-SI	M-3	GI,\$5-\$M-4		GL-SS-SM-5 AV	G DUP	GL-SS-SI		GL/SS-SN	1-6	GL/SS-SI	
Sample Depth	5'.7'		3'-5'	_	5'-7'		5'-7'		5'-7'		11/43		5'-7'	· · · · · · ·	11:43	j¹
Semivolatile Organics																
Phenol	1600	J	21000	J	4000	J	49000	B	38000	J	64000		65000		67000	
2 Chlorophenol	2350	U	39500	U	550	UJ	130000	υ	26750	IJ	6500	U	7000	U	7000	Į
1,4 Dichlorobenzene	490	J	39500	Ų	550	U	130000	U	26750	U	6500	U	7000	u	7000	1
1,2-Dichlorobenzene	1300)	39500	U	140	j	130000	U	15250	JU	6500	U	7000	U	7000	
2-Methylphenol	2350	U	39500	U	130	J	130000	U	26750	υ	6500	U	7000	U	7000	
4-Methylphenol	2350	U	3 95 00	U	2000	J	130000	U	26750	U	6500	IJ	7000	U	7000	
Isophorone	235 0	U	39500	υ	550	U	130000	U	26750	U	6500	U	7000	U	7000	1
2,4-Dimethylphenol	2350	U	39500	U	180	J	130000	U	26750	U	6500	u	7000	IJ	7(XX)	
1,2,4-Trichlorobenzene	1500	J	39500	U	190	J	130000	U	26750	U	6500	IJ	7(XX)	U	7(XX)	1
Naphthalene	<i>77</i> 0	J	8600	J	290)	130000	υ	19050	1	6500	U	7000	U	7000	1
2 Methylnaphthalene	930	J	39500	U	300	J	130000	U	50000	ţ	6500	U	70XX)	υ	7000	ı
Phenanthrene	520	J	39500	U	190	j	130000	U	10350	j	6500	U	7000	U	7(XX)	t
Di-n-butyl phthalate	2350	U	39500	U	550	U	130000	U	26750	υ	6500	U	7000	U	7000	ι
Pyrene	2350	U	39500	U	120	j	130000	U	26750	U	6500	U	7(XX)	u	7(XX)	1
Butyl benzyl phthalate	2350	บ	39500	υ	550	Ù	130000	U	26750	υ	6500	U	7(XX)	U	7000	
bis(2 Ethylhexyl) phthalate	29000		550000		4900		1300000		42500	J	6500	υ	33000		7000	Į
LOG TRANSFORMED DATA			421 431 43		621 CC 418		21 00 Ch 4 4		201 20 Ch4 # 411	w : 1 st (4s	are our on		(1) CC (1)		79. 00 C	
Sample Location	GL-SS-SN	1-1	GL/SS-SN 3'- 5 '	1-2	GL-SS-SI 5'-7'	VI3	GL-SS-SM-4 5'-7'		GL-SS SM-5 AV	GDOP	GL SS-SN		GL-SS-SN 5'-7'	4-6	GL-SS-SN	
Sample Depth	5'-7'		.12.		27.		5-7		5'- <i>7</i> '		11'-13		57.		11'-13'	
Semvolatile Organics																
Phenol	7.38		9.95		8.29		10.80		10.55		11.07		11.08		11.11	
2-Chlorophenol	7.76		10.58		6.31		11.78		10.19		8.78		8.85		8 85	
1,4-Dichlorebenzene	6.19		10.58		6.31		11.78		10.19		8.78		8.85		8.85	
1,2 Dichlorobenzene	7.17		10.58		4.94		11.78		9.63		8.78		8.85		8 85	
2-Methylphenol	7.76		10.58		4.87		11.78		10.19		8.78		8.85		8.85	
4 Methylphenol	7.76		10.58		7.60		11.78		10.19		8.78		8.85		8.85	
lsophorone	7.76		10.58		6.31		11.78		10.19		8.78		8.85		8.85	
2,4-Dimethylphenol	7.76		10.58		5.19		11.78		10.19		8.78		8.85		8.85	
1,2,4-Trichlorobenzene	7.31		10.58		5.25		11.78		10.19		8.78		8.85		8.85	
Naphthalene	6.65		9.06		5.67		11.78		9.85		8.78		8.85		8.85	
2 Methylnuphthalene	6.84		10.58		5.70		11.78		10.82		8.78		8.85		8.85	
Phenanthrene	6.25		10.58		5.25		11.78		9.24		8.78		8.85		8.85	
Di-n-butyl phthalate	7.76		10.58		6.31		11.78		10.19		8.78		8.85		8.85	
Pyrene	7.76		10.58		4.79		11.78		10.19		8.78		8.85		8.85	
Butyl benzyl phthalate	7.76		10.58		6.31		11.78		10.19		8.78		8.85		8.85	
bis(2-Ethylhexyl) phthalate	10.28		13.22		8.50		14.08		10.66		8.78		10.40		8.85	

All results are reported in units of ug/kg.

All U values represent one-half the detection limit.

Sample Location	GL-SS-SM-	-7	GL-SS-SM-7		GL-SS-SM-7 AV	G DUP	GL-SS-SM	-8	GL-SS-SM	-8	GL-SS-SM	-8	GL-SS-SM	1-8	GL-SS-SN	M-9
Sample Depth	3'-5'		7 '-9'		11'-13'		0'-1'		3'-5'		7'-9'		11'-13'		4'-6'	
Semivolatile Organics			:												-	
Phenol	130000	J	45000		3020	j	430000	j	330000	J	250000	В	53000		200	U
2-Chlorophenol	80000	U	4100	U	302.5	Ü	280000	Ū	195000	Ū	195000	U	130	J	200	U
1,4-Dichlorobenzene	80000	U	4100	U	302.5	U	91000	J	195000	U	195000	U	200	Ū	200	U
1,2-Dichlorobenzene	31000	J	4100	U	302.5	υ	230000	J	195000	U	195000	U	52	I	200	U
2-Methylphenol	80000	U	1900	J	302.5	U	280000	Ū	195000	U	195000	U	540	•	200	U
4-Methylphenol	80000	U	1400	Ĵ	302.5	U	280000	U	195000	U	195000	U	460		200	U
Isophorone	80000	U	4100	U	302.5	U	280000	U	195000	U	195000	U	48	J	200	U
2,4-Dimethylphenol	80000	U	1200	J	302.5	U	280000	U	195000	U	195000	U	200	Ū	200	U
1,2,4-Trichlorobenzene	42000	J	4100	ប	302.5	U	350000	J	195000	U	195000	U	60	J	200	U
Naphthalene '	80000	U	4100	U	302.5	υ	86000	J	195000	U	195000	U	200	Ū	200	U
2-Methylnaphthalene	18000	j	4100	U	302.5	U	130000	J	195000	U	195000	U	200	U	200	U
Phenanthrene	80000	U	4100	U	302.5	U	280000	U	195000	U	195000	U	200	U	200	U
Di-n-butyl phthalate	80000	U	4100	U	302.5	บ	280000	U	195000	U	195000	U	200	U	200	U
Pyrene	80000	U	4100	U	302.5	บ	280000	U	195000	U	195000	U	200	U	200	U
Butyl benzyl phthalate	80000	U	4100	U	302.5	U	280000	U	195000	U	195000	U	200	U	200	U
ois(2-Ethylhexyl) phthalate	720000		4100	U	1700		4000000		2700000		2300000		2500	ī	1000	

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Sample Location	GL-SS-SM-7	GL-SS-SM-7	GL-SS-SM-7 AVG DUP	GL-SS-SM-8	GL-SS-SM-8	GL-SS-SM-8	GL-SS-SM-8	GL-SS-SM-9
Sample Depth	3'-5'	<i>7</i> '-9'	11'-13'	0'-1'	3'-5'	7'-9'	11'-13'	4'-6'
Semivolatile Organics				· · · · · · · · · · · · · · · · · · ·				
Phenol	11.78	10.71	8.01	12.97	12.71	12.43	10.88	5.30
2-Chlorophenol	11.29	8.32	5.71	12.54	12.18	12.18	4.87	5.30
1,4-Dichlorobenzene	11.29	8.32	5.71	11.42	12.18	12.18	5.30	5.30
1,2-Dichlorobenzene	10.34	8.32	5.71	12.35	12.18	12.18	3.95	5.30
2-Methylphenol	11.29	7.55	5.71	12.54	12.18	12.18	6.29	5.30
4-Methylphenol	11.29	7.24	5.71	12.54	12.18	12.18	6.13	5.30
Isophorone	11.29	8.32	5.71	12.54	12.18	12.18	3.87	5.30
2,4-Dimethylphenol	11.29	7.09	5.71	12.54	12.18	12.18	5.30	5.30
1,2,4-Trichlorobenzene	10.65	8.32	5.71	12.77	12.18	12.18	4.09	5.30
Naphthalene	11.29	8.32	5.71	11.36	12.18	12.18	5.30	5.30
2-Methylnaphthalene	9.80	8.32	5.71	11.78	12.18	12.18	5.30	5.30
Phenanthrene	11.29	8.32	5.71	12.54	12.18	12.18	5.30	5.30
Di-n-butyl phthalate	11.29	8.32	5.71	12.54	12.18	12.18	5.30	5.30
Pyrene	11.29	8.32	5.71	12.54	12.18	12.18	5.30	5.30
Butyl benzyl phthalate	11.29	8.32	5.71	12.54	12.18	12.18	5.30	5.30
bis(2-Ethylhexyl) phthalate	13.49	8.32	7.44	15.20	14.81	14.65	7.82	6.91

All results are reported in units of ug/kg.

All U values represent one-half the detection limit.

95% Upper Confidence Limit Calculations for Semivolatile Organics Data for On-Site Soil 0-14 Feet Greiner's Lagoon Site, Fremont Ohio

Sam	ple Location	GL-SS-SN	VI-9	GL-85-SI	M-9	GL-SS-SM	-10	GL-SS-SM	1-10	GL-SS-SM	f-10	GL-88-8	5	GL-SS-SI	<u>1-1</u>	GLSS-S	B-2
Sa	mple Depth	6'-8'		12'-14	•	4'-6'		6'-8'		12'-14'	l .	0'-1'		6-8		6-8	
Semivolatile Organics	-																
Phenol		205	U	205	U	205	U	195	U	210	υ	85000	U	1400		6100	
2-Chlorophenol		205	U	205	U	205	U	195	U	210	U	85000	U				
1,4-Dichlorobenzene		205	U	205	U	205	U	195	υ	210	U	85000	U	200	U	405	U
1,2-Dichlorobenzene		205	บ	205	บ	205	υ	195	υ	210	บ	85000	u	200	u	405	บ
2-Methylphenol		205	U	205	U	205	U	195	U	210	U	85000	U	40	J	405	Ü
4-Methylphenol		205	U	205	U	205	U	195	U	210	U	85000	U	170	j	405	บ
Isophorone		380	J	205	U	205	U	195	U	210	U	85000	U	200	Ú	405	U
2,4-Dimethylphenol		205	U	205	U	205	U	195	U	210	υ	85000	U	200	U	405	IJ
1,2,4-Trichlorobenzene		205	U	205	υ	205	υ	195	υ	210	U	85000	U	200	U	405	บ
Naphthalene		205	U	205	U	205	U	195	υ	210	U	85000	U	200	U	405	U
2 Methylnaphthalene		205	U	205	U	205	U	195	U	210	U	85000	U	200	U	405	U
Phenanthrene		205	U	205	U	205	U	195	U	210	U	85000	U	200	U	405	U
Di n butyl phthalate		205	U	205	U	205	U	195	U	210	U	36000	J	200	U	405	U
Pyrene		205	U	205	υ	205	U	195	U	210	U	85000	Ü				
Butyl benzyl phthalate		205	U	205	U	205	U	195	U	210	U	86000	J	200	U	405	U
bis(2 Ethylhexyl) phthalate		480		350	1	1100		1400		460		870000	•	200	U	405	υ

Sample Location	GL-58-SM-9	GL-SS-SM-9	GL/SS-SM-10	GL-55-SM-10	GL-SS-SM-10	GL-SS-5S	GL/SS/SB-1	GL SS SB-2
Sample Depth	6'-8'	12'-14'	4'-6'	6'-8'	12'-14'	0'-1'	6-8	6-8
Semivolatile Organics						. ——		
Phenol	5.32	5.32	5 32	5.27	5.35	11.35	7.24	8.72
2-C'hlorophenol	5.32	5.32	5.32	5.27	5.35	11.35		
1,4-Dichlorobenzene	5.32	5.32	5.32	5.27	5.35	11.35	5.30	6.00
1,2-Dichlorobenzene	5.32	5.32	5.32	5.27	5.35	11.35	5.30	6.00
2-Methylphenol	5.32	5.32	5.32	5.27	5.35	11.35	3.69	6.00
4 Methylphenol	5.32	5.32	5.32	5.27	5.35	11.35	5.14	6.00
Isophorone	5.94	5.32	5.32	5.27	5.35	11.35	5.30	6.00
2,4-Dimethylphenol	5.32	5.32	5.32	5.27	5.35	11.35	5.30	6.00
1,2,4-Trichlorobenzene	5.32	5.32	5.32	5.27	5.35	11.35	5.30	6.00
Naphthalene	5.32	5.32	5.32	5.27	5.35	11.35	5.30	6.00
2-Methylnaphthalene	5.32	5.32	5.32	5.27	5.35	11.35	5.30	6.00
Phenanthrene	5.32	5.32	5.32	5.27	5.35	11.35	5.30	6.00
Di-n-butyl phthalate	5.32	5.32	5.32	5.27	5.35	10.49	5.30	6.00
Pyrene	5.32	5.32	5.32	5.27	5.35	11.35		
Butyl benzyl phthalate	5.32	5.32	5.32	5.27	5.35	11.36	5.30	6.00
bis(2-Ethylhexyl) phthalate	6.17	5.86	7.00	7.24	6.13	13.68	5.30	6.00

Notes:

All results are reported in units of ug/kg.

95% Upper Confidence Limit Calculations for Semivolatile Org...cs Data for On-Site Soil 0-14 Feet Greiner's Lagoon Site, Fremont Ohio

9	Sample Location	GL-SS-SB-3		GL-SS-SB-4 AV	G DUP	GL-SS-SB-5	(MW-2)	GL-SS-S	B-6	GL-SS-S	B-7	GL-SS-S	B-8	GL-SS-S	B-9
	Sample Depth	6-8		8-10		6-8		4-6		6-8		4-6		4-6	
Semivolatile Organics						-								 	
Phenol		195	U	57500		205	U	190	U	200	U	200	UJ	200	U
2-Chlorophenol													-		
1,4-Dichlorobenzene		195	U	4525	U	205	U	190	บ	200	U	200	UJ	200	U
1,2-Dichlorobenzene		195	U	4525	U	205	U	190	บ	200	U	200	υj	200	υ
2-Methylphenol		195	U	4525	บ	205	U	190	U	200	U	200	ÚĴ	200	U
4-Methylphenol		195	U	4525	U	205	U	190	υ	200	U	200	UĴ	200	U
Isophorone		19 5	U	4525	U	i 76	J	100	J	200	U	200	UJ	200	U
2,4-Dimethylphenol		195	U	4525	U	205	Ù	190	Ú	200	U	200	UJ	200	U
1,2,4-Trichlorobenzene	•	195	U	4525	U	205	υ	190	U	200	U	200	UJ	200	U
Naphthalene		195	U	4525	U	205	U	190	ប	200	U	200	UJ	200	U
2-Methylnaphthalene		195	U	4525	บ	205	U	190	U	200	U	200	υj	200	U
Phenanthrene		195	U	4525	บ	205	U	190	U	200	U	200	UJ	200	U
Di-n-butyl phthalate		195	U	4525	U	205	U	190	ប	200	U	200	UJ	200	U
Pyrene															
Butyl benzyl phthalate		195	U	4525	U	205	U	190	U	200	U	200	UJ	200	U
bis(2-Ethylhexyl) phtha		40	J	4525	U	1600		190	U	850	J	270	j	200	U

	Sample Location	GL-SS-SB-3	GL-SS-SB-4 AVG DUP	GL-SS-SB-5 (MW-2)	GL-SS-SB-6	GL-SS-SB-7	GL-SS-SB-8	GL-SS-SB-9
	Sample Depth	6-8	8-10	6-8	4-6	6-8	4-6	4-6
Semivolatile Organics								
Phenol		5.27	10.96	5.32	5.25	5.30	5.30	5.30
2-Chlorophenol								
1,4-Dichlorobenzene		5.27	8.42	5.32	5.25	5.30	5.30	5.30
1,2-Dichlorobenzene		5.27	8.42	5.32	5.25	5.30	5.30	5.30
2-Methylphenol		5.27	8.42	5.32	5.25	5.30	5.30	5.30
4-Methylphenol		5.27	8.42	5.32	5.25	5.30	5.30	5.30
Isophorone		5.27	8.42	4.33	4.61	5.30	5.30	5.30
2,4-Dimethylphenol		5.27	8.42	5.32	5.25	5.30	5.30	5.30
1,2,4-Trichlorobenzer	ne	5.27	8.42	5.32	5.25	5.30	5.30	5.30
Naphthalene		5.27	8.42	5.32	5.25	5.30	5.30	5.30
2-Methylnaphthalene		5.27	8.42	5.32	5.25	5.30	5.30	5.30
Phenanthrene		5.27	8.42	5.32	5.25	5.30	5.30	5.30
Di-n-butyl phthalate		5.27	8.42	5.32	5.25	5.30	5.30	5.30
Pyrene								
Butyl benzyl phthalat	e	5.27	8.42	5.32	5.25	5.30	5.30	5.30
bis(2-Ethylhexyl) pht		3.69	8.42	7.38	5.25	6.75	5.60	5.30

All results are reported in units of ug/kg.

95% Upper Confidence Limit Calculations for Semivolatile Organics Data for On-Site Soil 0-14 Feet Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-88-81	10	GL-88-8F	-11	GL-SS-SB	-12	GL-SS-SB-13 AV	วาบท	MW-1	3
Sample Depth	6-8		0-2		6-8		6-8		8-10	
Semivolatile Organics									-	
Phenol	130	j	85000	U	26000		197.5	υ	230	υ
2-Chlorophenol									230	U
1,4 Dichlorobenzene	200	U	85000	υ	200	U	197.5	U	230	U
1,2-Dichlorobenzene	200	U	39000)	200	υ	197.5	U	230	U
2-Methylphenol	200	U	85000	Ù	630		197.5	U	230	U
4-Methylphenol	200	U	85000	U	310	1	197.5	U	230	U
Isophorone	200	U	85000	U	200	Ü	197.5	u	230	U
2,4-Dimethylphenol	200	U	85000	U	200	U	197.5	U		
1,2,4 Trichlorobenzene	200	U	58000	J	200	U	197.5	U	230	U
Naphthalene	200	U	26000	j	200	U	197.5	U	230	U
2-Methylnaphthalene	200	U	26000	j	200	U	197.5	U	230	U
Phenanthrene	200	U	85000	Ū	200	U	197.5	U		
Din butyl phthalate	200	U	85000	U	200	υ	197.5	U		
Pyrene									230	U
Butyl benzyl phthalate	200	U	85000	UJ	200	U	197.5	U		
bis(2 Fthylhexyl) phthalate	370	J	510000	J	120	3	110.5	J	230	u

Sample Location	GL SS SB 10	GL \$5-\$B-11	GL SS-SB-12	GLSS-SB-13 AVG DUP	MW-13		Std				95%	Mux	Lower of Max
Sample Depth	6.8	0-2	6-8	6-8	8-10'	Mean	Dev	N	N-1	H stat	UCI.	Conc	Conc vs. UCL
Semivolatile Organics				·									
Phenol	4 87	11.35	10.17	5.29	5.44	8.30	2.87	36	35	5.035	2.81:+06	430,000	430,000
2-C'hlorophenol					5.44	8.21	2.80	23	22	5.416	4.7E+06	130	130
1,4-Dichlorobenzene	5.30	11.35	5.30	5.29	5.44	7.37	2.62	36	35	4.642	3.8E+05	91,000	91,000
1,2-Dichlorobenzene	5.30	10.57	5.30	5.29	5.44	7.28	2.64	36	35	4.675	3.8E+05	230,000	230,000
2-Methylphenol	5.30	11.35	6.45	5.29	5.44	7.40	2.70	36	35	4.775	5.6E+05	1,900	1,900
4-Methylphenol	5.30	11.35	5.74	5.29	5.44	7.48	2.63	36	35	4.667	4.5E+05	2,000	2,000
Isophorone	5.30	11.35	5.30	5.29	5.44	7.38	2.74	36	35	4.832	6.4E+05	100	100
2,4-Dimethylphenol	5.30	11.35	5.30	5.29		7.43	2.70	35	34	4.799	5.9E+05	1,200	1,200
1,2,4-Trichlorobenzene	5.30	10.97	5.30	5.29	5.44	7.35	2.69	36	35	4.755	5.0E+05	350,000	350,000
Naphthalene	5.30	10.17	5.30	5.29	5.44	7.28	2.52	36	35	4.495	2.4E+05	86,000	86,000
2 Methylnaphthalene	5.30	10.17	5.30	5.29	5.44	7.32	2.56	36	35	4.556	2.9E+05	130,000	130,000
Phenanthrene	5.30	11.35	5.30	5.29		7.40	2.68	35	34	4.768	5.4E+05	520	520
Di-n-butyl phthalate	5.30	11.35	5.30	5.29		7.48	2.65	35	34	4.721	5.0E+05	36,000	36,000
Pyrene					5.44	8.16	2.84	23	22	5.491	5.6E+06	120	120
Butyl benzyl phthalate	5.30	11.35	5.30	5.29		7.50	2.68	35	34	4.768	5.9E+05	86,000	86,000
bis(2-Ethylhexyl) phthalate	5.91	13.14	4.79	4.71	5.44	8.53	3.40	36	35	5.860	4.7E+07	4,000,000	4,000,000

Notes:

All results are reported in units of ug/kg.

95% Upper Confidence Limit Calculations for Pesticide/PCB Data for On-Site Soil 0-14 Feet Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-SS-SM	[-1-4	GL-SS-SM	-5-6	GL-SS-SM-S	5-6	GL-SS-SM	-7-8	GL-SS-SM-	7-8	GL-SS-SM	1-8	GL-SS-SM-	9-10	GL-SS-SM-	9-10	GL-SS-SM	-9-10
Sample Depth	5'-7'		5' <i>-7</i> '		11'-13'	_	3'-5'		7'-9'		0'-1'		4'-6'		6'-8'		12'-14'	•
Pesticide/PCB				,														
Endrin ketone	25.5	UJ	410	U	20	U	410	U	630	Ţ	2000	U	2	U	20.5	U	12.5	U
Aroclor 1254	360	J	4100	U	200	U	4100	U	5800	j	20000	U	20	U	205	U	125	U
										•								

Sample Location Sample Depth	GL-SS-SM-1-4 5'-7'	GL-SS-SM-5-6 5'-7'	GL-SS-SM-5-6 11'-13'	GL-SS-SM-7-8 3'-5'	GL-SS-SM-7-8 7'-9'	GL-SS-SM-8 0'-1'	GL-SS-SM-9-10 4'-6'	GL-SS-SM-9-10 6'-8'	GL-SS-SM-9-10 12'-14'
Pesticide/PCB							10-1-10-10-10-10-10-10-10-10-10-10-10-10		
Endrin ketone	3.24	6.02	3.00	6.02	6.45	7.60	0.69	3.02	2.53
Aroclor 1254	5.89	8.32	5.30	8.32	8.67	9.90	3.00	5.32	4.83

All results are reported in units of ug/kg.

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95% Upper Confidence Limit Calculations for Pesticide/PCB Data for On-Site Soil 0-14 Feet Greiner's Lagoon Site, Fremont Ohio

Sample Location Sample Depth	GL-SS-S 0'-1'	S	CL-SS-S 6-8	B-1	CL-SS-5 6-8		CL-SS-SB 6-8	-3	GL-SS-SB-4 AV0 8-10	G-DUP	GL-SS-SB-5 (M 6-8	1W-2)	GL-SS-9 4-6	_	GL-SS-9 6-8	
Penticide/PCB Endrin ketone	2100	υ														
Aroclor 1254	38000	j	20	U	20	UJ	19.5	U	20.25	U	20.5	U	19	ប	20	υ
							ı			 -						
Sample Location	GL-SS-S	S	GL-SS-S	B-1	GL-SS-S	3B-2	GL-SS-SB	-3	GL-SS-SB-4 AVO	G-DUP	GL-SS-SB-5 (M	(W-2)	GL-55-5	B-6	GL-SS-S	B-7
Sample Depth	0'-1'		6-8		6-8		6-8		8-10		6-8		4-6		6-8	
Pesticide/PCB																
Endrin ketone	7.65															
Aroclor 1254	10.55		3.00		3.00		2.97		3.01		3.02		2.94		3.00	
														·		

Notes:

All results are reported in units of ug/kg.

1 aule B-3 (Con't)
95% Upper Confidence Limit Calculations for Pesticide/PCB Data for On-Site Soil 0-14 Feet
Greiner's Lagoon Site, Fremont Ohio

Sample Location Sample Depth	GL-SS-S 4-6	B-8	GL-SS- 4-0		GL-SS-SE 6-8	3-10	GL-SS-SB 0-2	-11	GL-SS-SB- 6-8	-12	GL-SS-SB-13 AVG 6-8	-DUP
Pesticide/PCB Endrin ketone Aroclor 1254	20	U	20	UJ	20	U	2.7	J	20	υ	19.75	்

Sample Location G Sample Depth	SL-SS-SB-8 4-6	GL-SS-SB-9 4-6	GL-SS-SB-10 6-8	GL-SS-SB-11 0-2	GL-SS-SB-12 6-8	GL-SS-SB-13 AVG-DUP 6-8	Mean	Std Dev	N	N-1	H stat	95% UCL	Max Conc	Lower of M Conc vs. U
Pesticide/PCB											·			
Endrin ketone							4.6	2.41	10	9	6.397	3.1E+05	630	630
Aroclor 1254	3.00	3.00	3.00	0.99	3.00	2.98	4.65	2.67	23	22	5.195	7.1E+04	38000	38000

All results are reported in units of ug/kg.

95% Upper Confidence Limit Calculations for Metals Data for On-Site Soil 0-14 Feet Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-SS-SM	-1-4	GL-SS-SM	1-5-6	CL-SS-SN	1-5-6	GL-SS-SN	1-7-8	GL-SS-SM	1-7-8	GL-SS-SN	1-8	GL SS SM	.9-10	GL 55 5M	1-9-10
Sample Depth	5'-7"		5'-7'		11'-13	! *	3'-5'		7-9		0'-1'		4'-6'		6'-8'	
Metals																
Antimony	0.75	UJ	0.6	UJ	0.6	υj	0.6	UJ	0.6	ບງ	6.2	j	0.6	UJ	0.6	UJ
Arsenic	5.8		11.7		6.4	-	5.8	·	9.5	·	7.1	•	4.5	•	6.0	,
Cadmium	1.9		1.3		0.28		8.5		0.75		43.7		0.12	U	0.125	U
Chromium	12.3		9.0		6.9		21.9		6.8		94.6		6.2		6.0	
Copper	48.1	J	12.1	J	14.6	١,	30.5	j	11.4	J	102	j	8.0	J	13.3	ī
Lead	58.0	J	45.7	J	7.4	J	228	J	20.0	j	811	Ĵ	4.8	Ī	6.6	j
Mercury	0.075	U	0.06	U	0.06	U	0.33		0.06	U	1.3		0.06	IJ	0.06	Ù
Nickel	11.7	J	11.6	3	15.4	3	13.8	5	10.4	3	31.3	j	9.8	J	13.9	3
Selenium	0.385	UJ	0.305	ÚJ	0.305	ÚJ	0.305	ÚJ	0.295	ÚJ	3.4	j	0.3	ÚJ	0.31	ÚJ
Zinc	155	J [']	72.6	j	40.3	j	407	•	51.6	j	2470	j	30.3	j	33.2	j

Sample Location	GL-SS-SM-1-4	GL-SS-SM-5-6	GL-SS-SM-5-6	GL-SS-SM-7-8	GL-SS-SM-7-8	GL-SS-SM-8	GL-SS-SM-9-10	GL-SS SM-9-10
Sample Depth	5'- 7'	5'-7'	11'-13'	3'-5'	7'-9'	0'-1'	4' 6'	6' 8'
Metals								
Antimony	0.288	0.511	0.511	-0.511	0.511	1.825	0.511	0.511
Arsenic	1. <i>7</i> 58	2.460	1.856	1.758	2.251	1.960	1.504	1.792
- Cadmium	0.642	0.262	-1.273	2.140	-0.288	3. <i>7</i> 77	-2.120	-2.0 7 9
Chromium	2.510	2.197	1.932	3.086	1.917	4.550	1.825	1.792
Copper	3.873	2.493	2.681	3.418	2.434	4.625	2.079	2.588
Lead	4.060	3.822	2.001	5.429	2.996	6.698	1.569	1.887
Mercury	-2.590	-2.813	-2.813	-1.109	-2.813	0.262	-2.813	-2.813
Nickel	2.460	2.451	2.734	2.625	2.342	3.444	2.282	2.632
Selenium	-0.955	-1.187	-1.187	-1.18 7	-1.221	1.224	-1.204	-1.171
Zinc	5.043	4.285	3.696	6.009	3.944	7.812	3.411	3.503

Notes:

All results are reported in units of mg/kg.

95% Upper Confidence Limit Calculations for Metals Data or On-Site Soil 0-14 Feet Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-SS-SM	-9-10	GL-SS	-SS	MW-	13
Sample Depth	12'-14	,	0'-1	1	8-10)'
Metals						
Antimony	0.75	ប្យ	0.65	U	0.6	UJ
Arsenic	12.7		8.8		14.2	J
Cadmium	0.34		7.5		0.12	Ü
Chromium	16.8		22.7		13.7	J
Copper	26.6	J	29.3		25.3	
Lead	12.6	J	98.0		10.3	J
Mercury	0.075	Ū	0.33		0.06	Ü
Nickel	31.4	J	18.6		26.6	J
Selenium	0.375	ÚJ	0.315	ប្យ	0.3	ÚJ
Zinc	67.5	J	175		67.8	

GL-SS-SM-9-10	GL-SS-SS	MW-13		Std				95%	Max	Lower of Max
12'-14'	0'-1'	8-10'	Mean	Dev	N	N-1	H stat	ÜCL	Conc	Conc vs. UCL
				·	•					
-0.288	-0.431	-0.511	-0.25	0.69	11	10	2.457	1.7	6.2	1.7
2.542	2.175	2.653	2.06	0.38	11	10	2.028	10.8	14.2	10.8
-1.079	2.015	-2.120	-0.01	1.99	11	10	5.130	180.2	43.7	43.7
2.821	3.122	2.617	2.58	0.82	11	10	2.664	36.7	94.6	36.7
3.281	3.378	3.231	3.10	0.74	11	10	2.529	52.5	102	52.5
2.534	4.585	2.332	3.45	1.63	11	10	4.326	1109.9	811	811.0
-2.590	-1.10 9	-2.813	-2.18	1.05	11	10	3.096	0.5	1.3	0.5
3.447	2.923	3.281	2.78	0.43	11	10	2.091	23.6	31.4	23.6
-0.981	-1.155	-1.204	-0.93	0.72	11	10	2.499	0.9	3.4	0.9
4.212	5.165	4.217	4.66	1.31	11	10	3.617	1105.3	2470	1105.3
	-0.288 2.542 -1.079 2.821 3.281 2.534 -2.590 3.447 -0.981	12'-14' 0'-1' -0.288 -0.431 2.542 2.175 -1.079 2.015 2.821 3.122 3.281 3.378 2.534 4.585 -2.590 -1.109 3.447 2.923 -0.981 -1.155	12'-14' 0'-1' 8-10' -0.288 -0.431 -0.511 2.542 2.175 2.653 -1.079 2.015 -2.120 2.821 3.122 2.617 3.281 3.378 3.231 2.534 4.585 2.332 -2.590 -1.109 -2.813 3.447 2.923 3.281 -0.981 -1.155 -1.204	12'-14' 0'-1' 8-10' Mean -0.288 -0.431 -0.511 -0.25 2.542 2.175 2.653 2.06 -1.079 2.015 -2.120 -0.01 2.821 3.122 2.617 2.58 3.281 3.378 3.231 3.10 2.534 4.585 2.332 3.45 -2.590 -1.109 -2.813 -2.18 3.447 2.923 3.281 2.78 -0.981 -1.155 -1.204 -0.93	12'-14' 0'-1' 8-10' Mean Dev -0.288 -0.431 -0.511 -0.25 0.69 2.542 2.175 2.653 2.06 0.38 -1.079 2.015 -2.120 -0.01 1.99 2.821 3.122 2.617 2.58 0.82 3.281 3.378 3.231 3.10 0.74 2.534 4.585 2.332 3.45 1.63 -2.590 -1.109 -2.813 -2.18 1.05 3.447 2.923 3.281 2.78 0.43 -0.981 -1.155 -1.204 -0.93 0.72	12'-14' 0'-1' 8-10' Mean Dev N -0.288 -0.431 -0.511 -0.25 0.69 11 2.542 2.175 2.653 2.06 0.38 11 -1.079 2.015 -2.120 -0.01 1.99 11 2.821 3.122 2.617 2.58 0.82 11 3.281 3.378 3.231 3.10 0.74 11 2.534 4.585 2.332 3.45 1.63 11 -2.590 -1.109 -2.813 -2.18 1.05 11 3.447 2.923 3.281 2.78 0.43 11 -0.981 -1.155 -1.204 -0.93 0.72 11	12'-14' 0'-1' 8-10' Mean Dev N N-1 -0.288 -0.431 -0.511 -0.25 0.69 11 10 2.542 2.175 2.653 2.06 0.38 11 10 -1.079 2.015 -2.120 -0.01 1.99 11 10 2.821 3.122 2.617 2.58 0.82 11 10 3.281 3.378 3.231 3.10 0.74 11 10 2.534 4.585 2.332 3.45 1.63 11 10 -2.590 -1.109 -2.813 -2.18 1.05 11 10 3.447 2.923 3.281 2.78 0.43 11 10 -0.981 -1.155 -1.204 -0.93 0.72 11 10	12'-14' 0'-1' 8-10' Mean Dev N N-1 H stat -0.288 -0.431 -0.511 -0.25 0.69 11 10 2.457 2.542 2.175 2.653 2.06 0.38 11 10 2.028 -1.079 2.015 -2.120 -0.01 1.99 11 10 5.130 2.821 3.122 2.617 2.58 0.82 11 10 2.664 3.281 3.378 3.231 3.10 0.74 11 10 2.529 2.534 4.585 2.332 3.45 1.63 11 10 4.326 -2.590 -1.109 -2.813 -2.18 1.05 11 10 3.096 3.447 2.923 3.281 2.78 0.43 11 10 2.091 -0.981 -1.155 -1.204 -0.93 0.72 11 10 2.499	12'-14' 0'-1' 8-10' Mean Dev N N-1 H stat UCL -0.288 -0.431 -0.511 -0.25 0.69 11 10 2.457 1.7 2.542 2.175 2.653 2.06 0.38 11 10 2.028 10.8 -1.079 2.015 -2.120 -0.01 1.99 11 10 5.130 180.2 2.821 3.122 2.617 2.58 0.82 11 10 2.664 36.7 3.281 3.378 3.231 3.10 0.74 11 10 2.529 52.5 2.534 4.585 2.332 3.45 1.63 11 10 4.326 1109.9 -2.590 -1.109 -2.813 -2.18 1.05 11 10 3.096 0.5 3.447 2.923 3.281 2.78 0.43 11 10 2.499 0.9 -0.981 -1.155 -1.204 <td>12'-14' 0'-1' 8-10' Mean Dev N N-1 H stat UCL Conc -0.288 -0.431 -0.511 -0.25 0.69 11 10 2.457 1.7 6.2 2.542 2.175 2.653 2.06 0.38 11 10 2.028 10.8 14.2 -1.079 2.015 -2.120 -0.01 1.99 11 10 5.130 180.2 43.7 2.821 3.122 2.617 2.58 0.82 11 10 2.664 36.7 94.6 3.281 3.378 3.231 3.10 0.74 11 10 2.529 52.5 102 2.534 4.585 2.332 3.45 1.63 11 10 4.326 1109.9 811 -2.590 -1.109 -2.813 -2.18 1.05 11 10 3.096 0.5 1.3 3.447 2.923 3.281 2.78 0.43</td>	12'-14' 0'-1' 8-10' Mean Dev N N-1 H stat UCL Conc -0.288 -0.431 -0.511 -0.25 0.69 11 10 2.457 1.7 6.2 2.542 2.175 2.653 2.06 0.38 11 10 2.028 10.8 14.2 -1.079 2.015 -2.120 -0.01 1.99 11 10 5.130 180.2 43.7 2.821 3.122 2.617 2.58 0.82 11 10 2.664 36.7 94.6 3.281 3.378 3.231 3.10 0.74 11 10 2.529 52.5 102 2.534 4.585 2.332 3.45 1.63 11 10 4.326 1109.9 811 -2.590 -1.109 -2.813 -2.18 1.05 11 10 3.096 0.5 1.3 3.447 2.923 3.281 2.78 0.43

Notes:

All results are reported in units of mg/kg.

95% Upper Confidence Limit Calculations for Volatile Organics Data for Off-Site Soil 0-14 Feet Greiner's Lagoon Site, Fremont Ohio

Sample rocation	GL-SS-C	B-2	GL-SS-G	B-3	GL-SS-GI	3-4	GL-SS-G	B-5	GL-SS-G	B-7	GL-SS-C	3B-11	GL-SS-GB-14	C	SL SS-C	B-15 (GL-SS-C	B-15
Sample Depth	6-8'		8-10'		6-8'		6-8'		10-12	•	6-8	•	4-6'		4-6'		6-8'	
Volatile Organics																		
Acetone	12	Ţ	11000	J	4000	J	14	j	2500	J	26	J	11.5	U	13	U	6500	
2-Butanone	11.5	U	3000	Ū	1550	U	12.5	U	125	U	12	Ü	11.5	U	13	U	3800	
Benzene	2.9	U	75 0	U	360	j	9		31.5	U	3	υ	2.85	U	3.2	U	365	บ
4-Methyl-2-pentanone	11.5	U	32000	J	11000	J	12.5	υ	680		12	U	11.5	U	13	υ	1450	U
LOG TRANSFORMED DAT	` A																	
Sample Location		B-2	GL-SS-G	B-3	GL SS-GI	8-4	GL-SS-C	B-5	GL-55-G	B-7	GL 55-0	GB-11	GL-55-GB-14	C	SL SS-C	B-15	GL/SS-G	B-15
	CL-SS-C	B-2	GL-SS-G 8-10'	B-3	GL-SS-GI 6-8'	3-4	GL-55-G 6-8'	B-5	GL-55-G 10-12		GL 55-0 6-8		GL-55-GB-14 4-6'	C	GL SS-C 4-6'		GL-SS-G 6-8'	B-15
Sample Location	CL-SS-C	B-2		B-3		8-4		B-5						C				B-15
Sample Location Sample Depth Volatile Organics	CL-SS-C	B-2		B-3 		3-4		B-5						C				B-15
Sample Location Sample Depth	GL-SS-G 6-8'	B-2	8-10	B-3 	6-8'	3-4	6-8'	B-5	10-12		6-8		4-6'	C	4-6'		6-8'	B-15
Sample Location Sample Depth Volatile Organics Acetone	GL-SS-G 6-8' 2.485	B-2	8-10' 9.306	B-3 	6-8' 8.294	3-4	6-8 ¹ 2.639	B-5	10-12 7.824		6-8 3,258		4-6' 2.442	ı C	2.565		6-8' 8.780	B-15

All results are reported in units of ug/kg.

Table B-5 (Con't) 95% Upper Confidence Limit Calculations for Volatile Organics Data for Off-Site Soil 0-14 Feet Greiner's Lagoon Site, Fremont Ohio

GL-SS-G	B-15	GL-SS-C	B-17
8-10'		2-4'	
28000		11.5	UJ
1550	U	11.5	U
385	U	2.9	UJ
7800		11.5	UJ
	8-10 ^t 28000 1550 385	8-10' 28000 1550 U 385 U	28000 11.5 1550 U 11.5 385 U 2.9

Sample Location	GL-SS-GB-1	5 GL-SS-GB-17		Std				95%	Max	Lower of Max
Sample Depth	8-10'	2-4'	Mean	Dev	Ν	N-1	H stat	UCL	Conc	Conc vs. UCL
Volatile Organics										
Acetone ,	10.240	2.442	5.48	3.32	11	10	8.260	3.6E+08	28000	28000
2-Butanone	7.346	2.442	4.61	2.59	11	10	6.515	5.9E+05	3800	3800
Benzene	5.953	1.065	3.22	2.39	11	10	6.059	4.3E+04	750	75 0
4-Methyl-2-pentanone	8.962	2.442	5.21	3.29	11	10	8.174	2.0E+08	32000	32000

Notes:

All results are reported in units of ug/kg.
All U values represent one-half the detection limit.

Lable B-b 95% Upper Confidence Limit Calculations for Semivolatile Organics Data for Off-Site Soil 0-14 Feet Greiner's Lagoon Site, Fremont Ohio

GL-SS-GB-3

•										_						
Sample Depth	6-8'		8-10		6-8'		6-8'		10-12	•	6-8'		4-6'		4-6	
Semivolatile Organica																
Phenol	190	UJ	47000		21000		205	U	210	U	200	U	190	U	210	IJ
2-Methylphenol	190	UJ	3950	U	1000	J	205	U	210	U	200	U	190	U	210	บ
4-Methylphenol	190	UJ	3950	U	590 ,	J	205	U	210	U	200	U	190	U	210	U
Naphthalene	76	J	3950	U	2050	U	205	U	210	U	200	U	190	U	210	υ
bis(2-Ethylhexyl) phthalate	84	J	3950	U	2050	U	205	U	210	ប	5 7	J	190	U	210	ប
LOG TRANSFORMED DATA											·					
Sample Location	GL-SS-C	B-2	GL-SS-G	B3	GL-SS-GB	14	GL-55-G	B-5	GL-55-G	B-7	GL-SS-G	B-11	GL-SS-GI	B-14	GL SS-C	B-15
Sample Depth	6-8'		8-10		6-8'		6-8'		10-12)	6-8'		4-6'		4 6'	
Semivolatile Organics																
Phenol	5.25		10.76		9.95		5.32		5.35		5.30		5.25		5.35	
2-Methylphenol	5.25		8.28		6.91		5.32		5.35		5.30		5.25		5 35	
4 Methylphenol	5.25		8.28		6.38		5.32		5.35		5.30		5.25		5.35	
Naphthalene	4.33		8.28		7.63		5.32		5.35		5.30		5.25		5.35	
bis(2 Ethylhexyl) phthalate	4.43		8.28		7.63		5.32		5.35		4.04		5.25		5.35	

GL-SS-GB-5

GL-SS-GB-7

GL-SS-GB-11

GL-55-GB-14

GL-SS-GB-15

GL-SS-GB-4

Notes:

All results are reported in units of ug/kg.

All U values represent one-half the detection limit.

Sample Location GL-SS-GB-2

Table B-6 (Con't)
95% Upper Confidence Limit Calculations for Semivolatile Organics Data for Off-Site Soil 0-14 Feet
Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-SS-GE	-15	GL-SS-GE	-15	GL-SS-C	GB-17
Sample Depth	6-8'		8-10'		2-4	!
Semivolatile Organics						
Phenol	27000		16000		195	U
2-Methylphenol	1900	U	1350	U	195	U
4-Methylphenol	1900	U	1350	U	195	, U
Naphthalene	1900	U	1350	U	195	์ บ
bis(2-Ethylhexyl) phthalate	1900	U	1350	U	195	U

Sample Location	GL-SS-GB-15	GL-SS-GB-15	GL-SS-GB-17		Std				95%	Max	Lower of Max
Sample Depth	6-8'	8-10'	2-4'	Mean	Dev	N	N-1	H stat	UCL	Conc	Conc vs. UCL
Semivolatile Organics											
Phenol	10.20	9.68	5.27	7.06	2.46	11	10	6.219	3.0E+06	47000	47,000
2-Methylphenol	7.55	7.21	5.27	6.09	1.15	11	10	3.302	2.9E+03	1000	1,000
4-Methylphenol	7.55	7.21	5.27	6.05	1.12	11	10	4.970	4.7E+03	590	590
Naphthalene	7.55	7.21	5.27	6.08	1.32	11	10	3.642	4.7E+03	7 6	76
bis(2-Ethylhexyl) phthalate	7.55	7.21	5.27	5.97	1.43	11	10	3.880	6.3E+03	84	84

Notes:

All results are reported in units of ug/kg.

Table B-7
95% Upper Confidence Limit Calculations for Metals Data for Off-Site Soil 0-14 Feet Greiner's Lagoon Site, Fremont Ohio

Sample Location Sample Depth	GI, 98 G 4.6'	H- 1	G1,9%-G	B-4	GL98-GI 2-4'	3-6	GI,49-G 2-4'	B-8	GL-88-GB 6-8'	10	GL-89-GE 8-10*	-12	ਹੀ,ਮ 8 -ਹੀ 4-6'	≻13	GL98-GI 4-6'	3-15 -
Metalo																
Arsenic	2.6	J	4.9	J	9.0	j	2.3	J	8.2	J	9.1	J	1.5	j	5.0	1
Cadmium	0.115	U	0.125	U	0.145	Ü	0.12	Ü	0.27	·	0.13	Ü	0.12	Ú	0.12	Ú
Chromium	5.2		17.4		10.9		12.1		12.5		14.1		4.0		8.4	
Copper	8.8		27.1		11.1		6.2		25.9		27.3		7.3		15.4	
Load	5.0	j	12.3	J	13.5	j	6.5	J	13.5	J	13.1	J	4.1	j	8.6	j
Nickel	11.6		33.0		17.3		14.1		29.0	•	33.3		7.3	•	17.3	·
Zinc	28.2		81.3		63.1		54.4		74.6		80.7		27.1		50.6	

LOG	TRANSFO	RMED DATA	

Sample Location	GL/98-GB-1	GL-99-GB-4	GL-99-GB-6	GL-88-GB-8	GL-98-GB-10	GL-88-GB-12	G1.49-GB-13	GL-98-GB-15		Std			=, -	95%	Max	Lower of Max
Sample Depth	4-6'	6-8'	2-4'	2-4'	6-8'	8-10*	4-6'	4-6'	Mean	Dev	Ν	N-1	H stat	UCI.	Conc	Conc va. UCL
Metals														-		
Amenic	0.956	1.589	2.197	0.833	2.104	2.208	0.405	1.609	1.49	0.69	8	7	2.710	11.3	9.1	9.1
Cadmium	-2.163	-2.079	-1.931	-2.120	-1.309	-2.040	-2.120	-2.120	-1.99	0.28	8	7	2.038	0.2	0.27	0.2
Chromium	1.649	2.856	2.389	2.493	2.526	2.646	1.386	2.128	2.26	0.51	8	7	2.367	17.1	17.4	17.1
Copper	2.175	3,300	2.407	1.825	3.254	3.307	1.988	2.734	2.62	0.61	B	7	4.970	52.5	27.3	27.3
Irad	1.609	2.510	2.603	1.872	2.603	2.573	1.411	2.152	2.17	0.48	8	7	4.968	24.3	13.5	13.5
Nickel	2.451	3.497	2.851	2.646	3.367	3.506	1.988	2.851	2.89	0.54	8	7	2.427	34.3	33.3	33.3
Zinc	3.339	4.398	4.145	3.996	4.312	4.391	3.300	3.924	3.98	0.44	8	7	2.259	85.5	81.3	81.3

All results are reported in units of mg/kg.

Table B-8
95% Upper Confidence Limit Calculation for Volatile Organics Data for Perched On-Site Ground Water Greiner's Lagoon Site, Fremont Ohio

SAMPLE LOCATION:	GL-WS-SM-1 ave	g-dup	GL-WS-SN	1-4	GL-WS-SN	<i>I</i> -8	GL-WS-S	M-9	GL-WS-M	ſW-4	GL-WS-M	W-5	GL-WS-MV	N-6	GL-WS-M	IW-7
DATE COLLECTED:	4/9/96		4/11/96	5	4/11/9	5	4/12/9	96	7/22/9	96	7/23/9	6	7/23/96	5	7/23/9	Ж
Volatile Organics																
Acetone	25000		110000		170000		18	В	11	J	1600		24000	J	58000	
2-Butanone	7500	U	22000		12500	U	10	U	10	Ū	100	U	470	J	1500	J
Benzene	2250	J	2100	U	3100	U	2.5	U	9.1		110		310	Ù	1250	Ü
4-Methyl-2-pentanone	97500		110000		85000		20		10	บ	260		12000		30000	
Toluene	3150	В	10000		3100	U	2.5	U	2.5	U	25	U	310	U	1250	U
Ethylbenzene	1875	U	3800	J	3100	U	2.5	U	2.5	U	25	U	310	U	1250	U
Xylenes (total)	1350	J	19000	_	3100	U	2.5	U	2.5	U	25	U	310	U	1250	U

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SAMPLE LOCATION:	GL-WS-SM-1 avg-dup	GL-WS-SM-4	GL-WS-SM-8	GL-WS-SM-9	GL-WS-MW-4	GL-WS-MW-5	GL-WS-MW-6	GL-WS-MW-7
DATE COLLECTED:	4/9/96	4/11/96	4/11/96	4/12/96	7/22/96	7/23/96	7/23/96	7/23/96
Volatile Organics								
Acetone	10.127	11.608	12.0 44	2.890	2.398	7.378	10.086	10.968
2-Butanone	8.923	9.999	9.433	2.303	2.303	4.605	6.153	7.313
Benzene	7. 7 19	7.650	8.039	0.916	2.208	4.700	5.737	7.131
4-Methyl-2-pentanone	11.488	11.608	11.350	2.996	2.303	5.561	9.393	10.309
Toluene	8.055	9.210	8.039	0.916	0.916	3.219	5.737	7.131
Ethylbenzene	7.536	8.243	8.039	0.916	0.916	3.219	5.737	7.131
Xylenes (total)	7.208	9.852	8.039	0.916	0.916	3.219	5.737	7.131

All values reported in ug/L

U - This compound was analyzed but not detected. The numerical value represents one-half the quantitation limit of the compound.

J - This result should be considered a quantitative estimate.

UJ - This compound was analyzed but not detected. The numerical value that represents one-half the quantitation limit of the compound is a quantitative estimate.

B - This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration.

Table B-8 (Con't)
95% Upper Confidence Limit Calculation for Volatile Organics Data for Perched On-Site Ground Water
Greiner's Lagoon Site, Fremont Ohio

SAMPLE LOCATION:	GL-WS-M	1W-8	MW	4	MW-5 AVG-DUP	<u> </u>	MW-6		MW-7		MW-8	
DATE COLLECTED:	7/22/9	⊁ 6	11/11	/98	11/11/98		11/11/98		11/11/98		11/11/98	3
Volatile Organics							• • • • • • • • • • • • • • • • • • • •		<u> </u>			
Acetone	7.8	J	8.3	J	470		1400		19	3	6.3	ł
2-Butanone	10	Ü	10	U	74.5	j	200	U	10	Ú	10	Ú
Benzene	2.5	U	1.6	J	60	j	18]	23		1.3)
4-Methyl-2-pentanone	10	U	10	Ú	87.5	j	600	•	10	U	10	Ú
Toluene	2.5	υ	2.5	U	8.45	j	50	U	2.5	υ	2.5	U
Ethylbenzene	2.5	U	2.5	U	5.2	İ	50	U	2.5	U	2.5	Ü
Xylenes (total)	2.5	υ	2.5	υ	10.5	j	50	U	2.5	U	2.5	Ū

SAMPLE LOCATION:	GL-WS-MW-8	MW-4	MW-5 AVG-DUP	MW-6	MW-7	MW-8		Std				95%	Мих	Lower of Ma:
DATE COLLECTED:	7/22/96	****	11/11/98	11/11/98	11/11/98	11/11/98	Mean	Dev	Ν	N-1	H stat	UCL	Conc	Conc vs. UCI
Volatile Organics												-		
Acetone	2.054	2.116	6.153	7.244	2.944	1.841	6.42	3.99	14	13	8.851	3.2E+10	170000	170000
2 Butanone	2.303	2.303	4.311	5. 298	2 303	2 303	4.99	2.92	14	13	6.582	2.2E+06	22000	22000
Benzene	0.916	0.470	4.094	2.890	3.135	0.262	3.99	2.87	14	13	6.481	5.9E+05	2250	2250
4 Methyl 2 pentanone	2.303	2.303	4.472	6.397	2.303	2.303	6.08	3.92	14	13	8.704	1.3E+10	110000	110000
Toluene	0.916	0.916	2.134	3.912	0.916	0.916	3.78	3.20	14	13	7.168	4.3E+06	10000	10000
Ethylbenzene	0.916	0.916	1.649	3.912	0.916	0.916	3.64	3.05	14	13	6.851	1.3E+06	3800	3800
Xylenes (total)	0.916	0.916	2.351	3.912	0.916	0.916	3.78	3.20	14	13	7.172	4.3E+06	19000	19000

All values reported in ug/L

U - This compound was analyzed but not detected. The numerical value represents one-half the quantitation limit of the compound.

J - This result should be considered a quantitative estimate.

UJ - This compound was analyzed but not detected. The numerical value that represents one-half the quantitation limit of the compound is a quantitative estimate.

B - This result is qualitatively invalid since this analyte was detected in a blank at a similar concentration.

Table B-9
95% Upper Confidence Limit Calculation for Semivolatile Organics Data for Perched On-Site Ground Water Greiner's Lagoon Site, Fremont Ohio

Sample Collection C	GL-WS-SM-1 AVG DUF	GL-WS-	SM-4	GL-WS-SI	1-8	GL-WS-S	5M-9	GL-WS-	MW-4	GL-WS-I	√W-5	GL-WS-N	√W-6	GL-WS-N	MW-7
Date Collected	4/9/96	4/11,	/96	4/11/9	6	4/12/	96	7/22	/96	7/23/	96	7/23/	96	7/23/	'96
Semivolatile Organics			· · · · ·								-				
Phenol	44000	5800		320000		49	j	5	U	180	J	36000		9300	
2-Methylphenol	1200 J	250	U	40000	U	100	U	5	U	100	U	4000	U	1000	U
4-Methylphenol	5100 J	910		40000	U	100	U	5	บ	100	U	4000	U	1000	U
Isophorone	5450 U	530		40000	U	100	U	5	U	100	U	4000	U	1000	U
Naphthalene	5450 L	490	J	40000	U	100	บ	5	U	100	U	4000	U	1000	U
Fluoranthene	5450 L	250	U	40000	U	100	ប	10		100	U	4000	U	1000	U
bis(2-Ethylhexyl) phthalate	4700 J	4100		40000	U	100	U	5	U	100	U	4000	U	1000	U

Sample Collection	GL-WS-SM-1 AVG DUP	GL-WS-SM-4	GL-WS-SM-8	GL-WS-SM-9	GL-WS-MW-4	GL-WS-MW-5	GL-WS-MW-6	GL-WS-MW-7
Date Collected	4/9/96	4/11/96	4/11/96	4/12/96	7/22/96	7/23/96	7/23/96	7/23/96
Semivolatile Organics								
Phenol	10.692	8.666	12.676	3.892	1.609	5.193	10.491	9.138
2-Methylphenol	7.090	5.521	10.597	4.605	1.609	4.605	8.294	6.908
4-Methylphenol	8.537	6.813	10.597	4.605	1.609	4.605	8.294	6.908
Isophorone	8.603	6.273	10.597	4.605	1.609	4.605	8.294	6.908
Naphthalene	8.603	6.194	10.597	4.605	1.609	4.605	8.294	6.908
Fluoranthene	8.603	5.521	10.597	4.605	2.303	4.605	8.294	6.908
bis(2-Ethylhexyl) phthalate	8.455	8.319	10.597	4.605	1.609	4.605	8.294	6.908

Notes:

All results are reported in units of ug/L.

U - This compound was analyzed but not detected. The numerical value represents one-half the quantitation limit of the compound.

J - This result should be considered a quantitative estimate.

UJ - This compound was analyzed but not detected. The numerical value that represents one-half the quantitation limit of the compound is a quantitative estimate.

Table B-9 (Con't)
95% Upper Confidence Limit Calculation for Semivolatile Organics Data for Perched On-Site Ground Water
Greiner's Lagoon Site, Fremont Ohio

Sample Collection	GL-WS-MW-8		MW-4		MW-5 avg dup		MW-6		MW-7		MW-8	
Date Collected	7/22/96		11/11/98		11/11/98		11/11/98		11/11/98		11/11/98	i
Semivolatile Organics			-									
Phenol	5	UJ	25	U	<i>7</i> 5	U	1400		50	U	20	U
2-Methylphenol	5	UJ	25	υ	75	υ	125	υ	50	υ	20	υ
4-Methylphenol	5	UJ	25	U	75	U	125	U	50	υ	20	U
Isophorone	5	υ	25	U	<i>7</i> 5	U	125	U	50	U	20	U
Naphthalene	5	U	25	U	75	U	125	U	50	U	20	U
Fluoranthene	5	U	25	U	75	U	125	U	50	U	20	U
bis(2 Ethylhexyl) phthalate	5	U	25	U	<i>7</i> 5	U	125	U	50	υ	20	U

L-WS-MW-8	MW-4	MW-5	MW-6	MW-7	MW-8		Std				95%	Max	Lower of Max
7/22/96	11/11/98	11/11/98	11/11/98	11/11/98	11/11/98	Mean	Dev	Ν	N-1	H stat	UCL.	Conc	Conc vs. UCL
1.609	3.219	4.317	7.244	3.912	2.996	6.12	3.64	14	13	8.107	1.3E+09	320000	320000
1.609	3.219	4.317	4.828	3.912	2.996	5.01	2.52	14	13	5 866	2 2E+05	1200	1200
1 609	3.219	4.317	4.828	3.912	2.996	5.20	2.68	14	13	6.069	5.9E+05	5100	5100
1.609	3.219	4.317	4.828	3.912	2.996	5.17	2.66	14	13	6.039	5.3E+05	530	530
1.609	3.219	4.317	4.828	3.912	2.996	5.16	2.66	14	13	6.033	5.2E+05	490	490
1.609	3.219	4.317	4.828	3.912	2.996	5.17	2.58	14	13	5.868	3.3E+05	10	10
1.609	3.219	4.317	4.828	3.912	2.996	5.31	2.77	14	13	6.259	1.1E+06	4700	4700
	1.609 1.609 1.609 1.609 1.609	1.609 3.219 1.609 3.219 1.609 3.219 1.609 3.219 1.609 3.219 1.609 3.219	1.609 3.219 4.317 1.609 3.219 4.317 1.609 3.219 4.317 1.609 3.219 4.317 1.609 3.219 4.317 1.609 3.219 4.317 1.609 3.219 4.317	1.609 3.219 4.317 7.244 1.609 3.219 4.317 4.828 1.609 3.219 4.317 4.828 1.609 3.219 4.317 4.828 1.609 3.219 4.317 4.828 1.609 3.219 4.317 4.828 1.609 3.219 4.317 4.828	1.609 3.219 4.317 7.244 3.912 1.609 3.219 4.317 4.828 3.912 1.609 3.219 4.317 4.828 3.912 1.609 3.219 4.317 4.828 3.912 1.609 3.219 4.317 4.828 3.912 1.609 3.219 4.317 4.828 3.912 1.609 3.219 4.317 4.828 3.912	1.609 3.219 4.317 7.244 3.912 2.996 1.609 3.219 4.317 4.828 3.912 2.996 1.609 3.219 4.317 4.828 3.912 2.996 1.609 3.219 4.317 4.828 3.912 2.996 1.609 3.219 4.317 4.828 3.912 2.996 1.609 3.219 4.317 4.828 3.912 2.996 1.609 3.219 4.317 4.828 3.912 2.996	1.609 3.219 4.317 7.244 3.912 2.996 6.12 1.609 3.219 4.317 4.828 3.912 2.996 5.01 1.609 3.219 4.317 4.828 3.912 2.996 5.20 1.609 3.219 4.317 4.828 3.912 2.996 5.17 1.609 3.219 4.317 4.828 3.912 2.996 5.16 1.609 3.219 4.317 4.828 3.912 2.996 5.17	1.609 3.219 4.317 7.244 3.912 2.996 6.12 3.64 1.609 3.219 4.317 4.828 3.912 2.996 5.01 2.52 1.609 3.219 4.317 4.828 3.912 2.996 5.20 2.68 1.609 3.219 4.317 4.828 3.912 2.996 5.17 2.66 1.609 3.219 4.317 4.828 3.912 2.996 5.16 2.66 1.609 3.219 4.317 4.828 3.912 2.996 5.17 2.58	1.609 3.219 4.317 7.244 3.912 2.996 6.12 3.64 14 1.609 3.219 4.317 4.828 3.912 2.996 5.01 2.52 14 1.609 3.219 4.317 4.828 3.912 2.996 5.20 2.68 14 1.609 3.219 4.317 4.828 3.912 2.996 5.17 2.66 14 1.609 3.219 4.317 4.828 3.912 2.996 5.16 2.66 14 1.609 3.219 4.317 4.828 3.912 2.996 5.17 2.58 14 1.609 3.219 4.317 4.828 3.912 2.996 5.17 2.58 14	1.609 3.219 4.317 7.244 3.912 2.996 6.12 3.64 14 13 1.609 3.219 4.317 4.828 3.912 2.996 5.01 2.52 14 13 1.609 3.219 4.317 4.828 3.912 2.996 5.20 2.68 14 13 1.609 3.219 4.317 4.828 3.912 2.996 5.17 2.66 14 13 1.609 3.219 4.317 4.828 3.912 2.996 5.16 2.66 14 13 1.609 3.219 4.317 4.828 3.912 2.996 5.17 2.58 14 13 1.609 3.219 4.317 4.828 3.912 2.996 5.17 2.58 14 13	1.609 3.219 4.317 7.244 3.912 2.996 6.12 3.64 14 13 8.107 1.609 3.219 4.317 4.828 3.912 2.996 5.01 2.52 14 13 5.866 1.609 3.219 4.317 4.828 3.912 2.996 5.20 2.68 14 13 6.069 1.609 3.219 4.317 4.828 3.912 2.996 5.17 2.66 14 13 6.039 1.609 3.219 4.317 4.828 3.912 2.996 5.16 2.66 14 13 6.033 1.609 3.219 4.317 4.828 3.912 2.996 5.17 2.58 14 13 5.868	1.609 3.219 4.317 7.244 3.912 2.996 6.12 3.64 14 13 8.107 1.3E+09 1.609 3.219 4.317 4.828 3.912 2.996 5.01 2.52 14 13 5.866 2.2E+05 1.609 3.219 4.317 4.828 3.912 2.996 5.20 2.68 14 13 6.069 5.9E+05 1.609 3.219 4.317 4.828 3.912 2.996 5.17 2.66 14 13 6.039 5.3E+05 1.609 3.219 4.317 4.828 3.912 2.996 5.16 2.66 14 13 6.033 5.2E+05 1.609 3.219 4.317 4.828 3.912 2.996 5.17 2.58 14 13 5.868 3.3E+05	1.609 3.219 4.317 7.244 3.912 2.996 6.12 3.64 14 13 8.107 1.3E+09 320000 1.609 3.219 4.317 4.828 3.912 2.996 5.01 2.52 14 13 5.866 2.2E+05 1200 1.609 3.219 4.317 4.828 3.912 2.996 5.20 2.68 14 13 6.069 5.9E+05 5100 1.609 3.219 4.317 4.828 3.912 2.996 5.17 2.66 14 13 6.039 5.3E+05 530 1.609 3.219 4.317 4.828 3.912 2.996 5.16 2.66 14 13 6.033 5.2E+05 490 1.609 3.219 4.317 4.828 3.912 2.996 5.17 2.58 14 13 5.868 3.3E+05 10

All results are reported in units of ug/L.

U - This compound was analyzed but not detected. The numerical value represents one-half the quantitation limit of the compound.

J - This result should be considered a quantitative estimate.

UJ - This compound was analyzed but not detected. The numerical value that represents one-half the quantitation limit of the compound is a quantitative estimate.

95% Upper Confidence Limit Calculation for Metals Data for Pe 1 On-Site Ground Water Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-WS-SM-1 AVG DU	ΙP	GL-WS-SN	1-4	GL-WS-SN	<i>1</i> -8	GL-WS-SN	1-9	GL-WS-M	W-4	GL-WS-M	<i>N</i> -5	GL-WS-M	V -6	GL-WS-MV	V-7	GL-WS-MW-
Date Collected	4/9/96		4/11/96	5	4/11/90	5	4/12/96	•	7/22/90	5	7/23/96	5	7/23/90	5	7/23/96	,	7/22/96
Metals																	
Aluminum	57.5		NA		NA		NA		NA		NA		NA		NA		NA
Antimony	0.0185	J	0.005	U	0.005	U	0.01	ប	0.005	U	0.005	U	0.005	U	0.005	U	0.005
Arsenic	0.053	J	0.095		0.35		0.11		0.025		0.034		0.073		0.16		0.044
Barium	9.05		NA		NA		NA		NA		NA		NA		NA		NA
Cadmium	0.023	J	0.011		0.0085		0.013		0.001	U	0.001	U	0.001	U	0.0047		0.0079
Chromium	0.265		0.070		0.10		0.20		0.035		0.027		0.014		0.063		0.10
Cobalt	0.0375	J	NA		NA	i	NA		0.025	U	0.025	U	0.025	U	0.065		0.095
Copper	0.57	J	0.18		0.18	·	0.63		0.057		0.038		0.0125	U	0.16		0.29
Iron	106		NA		NA		NA		NA		NA		NA		. NA		NA
Lead	3.35		0.19		0.21		0.33		0.026		0.016		0.0074		0.067		0.096
Manganese	2.25		NA		NA		NA		NA		NA		NA		NA		NA
Mercury	0.0043	J	0.0005	U	0.0001	U	0.00052		0.0001	U	0.0001	U	0.0001	U	0.0001	U	0.0001
Nickel	0.3	J	0.17		0.84		0.42		0.074		0.063		0.02	υ	0.19		0.21
Vanadium	0.205	J	NA		NA		NA		NA		NA		NA		NA		NA
Zinc	3.5		1.1		0.68		1.6		0.18		0.14		0.072		0.40		0.69

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Sample Location	GL-WS-SM-1 AVG DUP	GL-WS-SM-4	GL-WS-SM-8	GL-WS-SM-9	GL-WS-MW-4	GL-WS-MW-5	GL-WS-MW-6	GL-WS-MW-7	GL-WS-MW-
Date Collected	4/9/96	4/11/96	4/11/96	4/12/96	7/22/96	7/23/96	7/23/96	7/23/96	7/22/96
Metals									
Aluminum	4.052								
Antimony	-3.990	-5.298	-5.298	-4.605	-5.298	-5.298	-5. 29 8	-5.298	-5.298
Arsenic	-2.937	-2.354	-1.050	-2.207	-3.689	-3.381	-2.617	-1.833	-3.124
Barium	2.203								
Cadmium	-3.772	-4.510	-4.768	-4.343	-6.908	-6.908	-6.908	-5.360	-4.841
Chromium	-1.328	-2.659	-2.303	-1.609	-3.352	-3.612	-4.269	-2.765	-2.303
Cobalt	-3.283				-3.689	-3.689	-3.689	-2.733	-2.354
Copper	-0.562	-1. 7 15	-1. <i>7</i> 15	-0.462	-2.865	-3.270	-4.382	-1.833	-1.238
Iron	4.663								
Lead	1.209	-1.661	-1.561	-1.109	-3.650	-4.135	-4.906	-2.703	-2.343
Manganese	0.811								
Mercury	-5.449	-7.601	-9.210	-7.562	-9.210	-9.210	-9.210	-9.210	-9.210
Nickel	-1.204	-1.772	-0.1 74	-0.868	-2.604	-2.765	-3.912	-1.661	-1.561
Vanadium	-1.585								
Zinc	1.253	0.095	-0.386	0.470	-1. <i>7</i> 15	-1.966	-2.631	-0.916	-0.371

All results are reported in units of mg/L.

U - This compound was analyzed but not detected. The numerical value represents one-half the quantitation limit of the compound.

J - This result should be considered a quantitative estimate.

95% Upper Confidence Limit Calculation for Metals Data for Perched On-Site Ground Water Greiner's Lagoon Site, Fremont Ohio

Sample Location	MW-4		MW-5 AVG-DUP		MW-6		MW-7		MW-8	
Date Collected	11/11/98		11/11/96		11/11/98		11/11/98		11/11/98	
Metals										
Aluminum	NA		NA		NA		NA		NA	
Antimony	0.005	U	0.005	U	0.005	υ	0.005	υ	0.005	U
Amenic	0.018	J	0.033	j	0.066)	0.086	j	0.039	1
Barium	NA		NA		NA	•	NA		NA	•
Cadmium	0.001	U	0.001	U	0.001	U	0.001	U	0.001	υ
Chromium	0 020		0.016		0.0025	U	0.0025	U	0.0068	
Cobalt	NA		NA		NA		NA		NA	
Copper	0.038		0.081	Jυ	0.041		0.028		0.026	
Iron	NA		NA		NA		NA		NA	
Lead	0.013		0.010	JU	0.0015	U	0.0033		0.0088	
Manganese	NA		NA		NA		NA		NA	
Mercury	0.0001	U	0.0001	U	0.0001	U	0.0001	U	0.0001	U
Nickel	0.02	U	0.075		0.02	U	0.02	U	0.02	U
Vanadium	NA		NA		NA		NA		NA	
Zinc	0.15		0.215		0.063		0.11		0.12	

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Sample Location	MW-4	MW-5 AVG DUP	MW-6	MW-7	MW-8		Std			-	95%	Max	Lower of Max
Date Collected	11/11/98	11/11/98	11/11/98	11/11/98	11/11/98	Mean	Dev	Ν	N-1	H stat	UCL.	Conc	Conc vs. UCL
Metals													
Aluminum						4.05	N/A	1	0	N/A	N/A	57.500	57.500
Antimony	-5 298	-5.298	-5. 298	-5.298	-5.298	-5.16	0.38	14	13	1.969	0.008	0.019	0.008
Arsenic	-4.017	-3.427	-2. 7 18	-2.453	-3.244	-2.79	0.79	14	13	2.45 9	0.143	0.350	0.143
Barium						2.20	N/A	1	0	N/A	N/A	9.050	9.050
Cadmium	-6.908	-6.908	-6.908	-6.908	-6.908	-5.92	1.23	14	13	3.193	0.017	0.023	0.017
Chromium	-3.912	-4.135	-5. 99 1	-5.991	-4.733	-3.50	1.46	14	13	3.608	0.375	0.265	0.265
Cobalt						-3.24	0.57	6	5	2.826	0.095	0.095	0.095
Copper	-3.270	-2.510	-3.194	-3.576	-3.6 5 0	-2.45	1.21	14	13	3.153	0.517	0.630	0.517
Iron						4.66	N/A	1	0	N/A	N/A	106	106
Lead	-4.343	-4.580	-6.502	-5.714	-4.733	-3.34	2.08	14	13	4.843	5.086	3.350	3.350
Manganese						0.81	N/A	1	0	N/A	N/A	2.250	2.250
Mercury	-9.210	-9.210	-9.210	-9.210	- 9 .210	-8.71	1.11	14	13	2.978	0.001	0.004	0.001
Nickel	-3.912	-2.590	-3.912	-3.912	-3.912	-2.48	1.30	14	13	3.256	0.627	0.840	0.627
Vanadium						-1.58	N/A	1	0	N/A	N/A	0.205	0.205
Zinc	-1.897	-1.537	-2.765	-2.207	-2.120	-1.19	1.23	14	13	3.194	1.930	3.500	1.930

All results are reported in units of mg/L.

U - This compound was analyzed but not detected. The numerical value represents one-half the quantitation limit of the compound.

J - This result should be considered a quantitative estimate.

95% Upper Confidence Limit Calculation for Volatile Organics Data for Perched Off-Site Ground Water Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-WS-GB-7		GL-WS-GB-15		MW9		MW-10		MW-11		MW-12		MW-13	
Date Collected	12/18/96 12/20/96		11/11/98		11/11/98		11/11/98		11/11/98		11/11/98			
Volatile Organics		-												
Acetone	10	U	10	U	16	J	10	j	11	J	19	J	4000	
4-Methyl-2-pentanone	10	U	3.7	J	3.7	J	10	U	10	U	15	J	335	U
I OC TRANSCORMED DATA			<u>,</u>											
LOG TRANSFORMED DATA												•		
	GL-WS-GB-7		GL-WS-GB-15		MW9		MW-10		MW-11		MW-12		MW-13	
LOG TRANSFORMED DATA Sample Location Date Collected	GL-WS-GB-7 12/18/96		GL-WS-GB-15 12/20/%		MW9 11/11/98		MW-10 11/11/98		MW-11 11/11/98		MW-12 11/11/98	-	MW-13 11/11/98	
Sample Location														
Sample Location Date Collected														

All results reported in ug/L.

U - This compound was analyzed but not detected. The numerical value represents one-half the quantitation limit of the compound.

J - This result should be considered a quantitative estimate.

UJ - This compound was analyzed but not detected. The numerical value that represents one-half the quantitation limit of the compound is a quantitative estimate.

1able B-11 (Con't)
95% Upper Confidence Limit Calculation for Volatile Organics Data for Perched Off-Site Ground Water
Greiner's Lagoon Site, Fremont Ohio

Sample Location Date Collected	MW-13 1/20/99		MW-13 1/28/99	,	MW-14 AVC+DUP 11/11/96	
Volatile Organics						
Acetone	10	UJ	10	U	10	U
4-Methyl-2-pentanone	10	U	10	U	10	U

Sample Location	MW-13	MW-13	MW-14 AVG-DUP		Std				95%	Max	Lower of Max
Date Collected	1/20/99	1/28/99	11/11/98	Moan	Dev	Ν	N-1	H stat	UCL	Conc	Conc vs. UCL
Volatile Organics											
Acetone	2.30	2.30	2.30	3.022	1.87	10	9	5.0753	2758.3	4000	2758
4 Methyl-2-pentanone	2.30	2.30	2.30	2,495	1.25	10	9	3.6390	121.2	15	15

Notes:

All results reported in ug/L.

- U This compound was analyzed but not detected. The numerical value represents one-half the quantitation limit of the compound.
- J This result should be considered a quantitative estimate.
- U) This compound was analyzed but not detected. The numerical value that represents one-half the quantitation limit of the compound is a quantitative estimate.

95% Upper Confidence Limit Calculation for Metals Data for Perched Off-Site Ground Water Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-WS-GB-1	(GL-WS-GB-3	}	GL-WS-GB-	4	GL-WS-GB-7		GL-WS-GB-9)	GL-WS-GB-11		GL-WS-GB-13		MW9		MW-10	
Date Collected	12/16/96		12/17/96		12/17/96		12/18/96		12/18/96		12/19/96		12/19/96		11/11/98	;	11/11/98	
Metals							<u> </u>								······································			
Arsenic	0.005	UJ	0.041	J	0.018	J	0.005	IJ	0.011	J	0.011	J	0.005	ប្យ	0.016	J	0.005	UJ
Beryllium	0.0050	U	0.0025	U	0.00125	Ū	0.0025	U	0.0093		0.014		0.0025	Ū	0.0025	Ū	0.0025	ΰ
Cadmium	0.001	U	0.0020		0.0055		0.001	U	0.0086		0.020		0.001	U	0.001	U	0.001	U
Chromium	0.020		0.057		0.089		0.028		0.27		0.44		0.070		0.016		0.016	
Cobalt	0.0050	U	0.025	U	0.0125	U	0.025	U	0.22		0.35		0.025	U				
Copper	0.0020		0.076		0.11		0.032		0.34		0.74		0.11		0.035		0.0125	ប្យ
Lead	0.025		0.036		0.14		0.015		0.18		0.36		0.052		0.015		0.0095	
Mercury	0.0025	UJ	0.0001	UJ	0.00056	J	0.0001	UJ	0.00045	J	0.00081	J	0.0001	UJ	0.0001	U	0.0001	U
Nickel	0.001	U	0.11		0.12		0.02	U	0.48		0.86		0.14		0.02	U	0.02	U
Zinc	0.098		0.32		0.72		0.13		1.5		2.8		0.42		0.13		0.095	

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Sample Location	GL-WS-GB-1	GL-WS-GB-3	GL-WS-GB-4	GL-WS-GB-7	GL-WS-GB-9	GL-WS-GB-11	GL-WS-GB-13	MW9	MW-10
Date Collected	12/16/96	12/17/96	12/17/96	12/18/96	12/18/96	12/19/96	12/19/96	11/11/98	11/11/98
Metals									
Arsenic	-5.298	-3.194	-4 .017	-5.298	-4 .510	-4 .510	-5.298	-4 .135	-5. 298
Beryllium	-5.298	-5.991	-6.685	-5.991	-4 .678	-4 .269	-5.991	-5.991	-5. 991
Cadmium	-6.908	-6.215	-5.203	-6.908	-4.756	-3.912	-6.908	-6.908	-6.908
Chromium	-3.912	-2.865	-2.419	-3.576	-1.309	-0.821	-2.659	-4.135	-4.135
Cobalt	-5.298	-3.689	-4 .382	-3.689	-1.514	-1.050	-3.689		
Соррег	-6.215	-2.5 77	-2.207	-3.442	-1.079	-0.301	-2.207	-3.352	-4.382
_ead	-3.689	-3.324	-1. 96 6	-4.200	<i>-</i> 1. <i>7</i> 15	-1.022	-2.957	-4.200	-4.656
Mercury	-5.991	-9.210	-7.488	-9.210	<i>-7.70</i> 6	-7.118	-9.210	-9.210	-9.210
Nickel	-6.908	-2.207	-2.120	-3.912	-0.734	-0.151	-1.966	-3.912	-3.912
Zinc	-2.323	-1.139	-0.329	-2.040	0.405	1.030	-0.868	-2.040	-2.354

All results are reported in units of mg/L.

U - This compound was analyzed but not detected. The numerical value represents one-half the quantitation limit of the compound.

J - This result should be considered a quantitative estimate.

UJ - This compound was analyzed but not detected. The numerical value that represents one-half the quantitation limit of the compound is a quantitative estimate.

Table B-12 (Con't)
95% Upper Confidence Limit Calculation for Metals Data for Perched Off-Site Ground Water
Greiner's Lagoon Site, Fremont Ohio

Sample Location	MW-11		MW-12		MW-13	M	1W-14 AVG-DU	P
Date Collected	11/11/98		11/11/98		11/11/98		11/11/98	
Metals								
Arsonic	0.011	J	0.005	UJ	0.039	J	0.028	j
Beryllium	0.0025	U	0.0025	U	0.0025	Ü	0.0025	Ù
Cadmium	0.001	U	0.001	U	0.001	U	0.001	U
Chromium	0.012		0.023		0.039	1	0.026	
Cobalt								
Соррег	0.0125	UJ	0.029		0.080		0.072	
Lond	0.011		0.014		0.037		0.0305	
Mercury	0.0001	U	0.0001	U	0.0001	U	0.0001	U
Nickel	0.040		0.02	U	0.084		0.0695	
Zinc	0.11		0.13		0.24		0.235	

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Sample Location	MW-11	MW-12	MW-13	MW-14 AVG-DUP		Std				95%	Max	Lower of Max
Date Collected	11/11/98	11/11/98	11/11/98	11/11/98	Mean	Dev	Ν	N-1	H stat	UCI.	Conc	Conc vs. UCL
Metals								. , ,				
Arsenic	-4.510	-5.298	-3.244	-3.576	4.48	0.80	13	12	2.158	0.0258	0.041	0.0258
Beryllium	-5.991	5.991	-5. 991	-5. 99 1	-5.76	0.64	13	12	1.929	0.0055	0.014	0.0055
Cadmium	-6.908	-6.908	-6. 908	-6.908	-6.33	1.03	13	12	2.436	0.0062	0.020	0.0062
Chromium	-4.423	-3.772	-3.244	-3.650	-3.15	1.10	13	12	3.037	0.2081	0.44	0.2081
Cobalt			•		-3.33	1.52	7	6	2.595	0.5685	0.35	0.3500
Copper	-4.382	-3.540	-2.526	-2.631	-2.99	1.51	13	12	2.940	0.5742	0.74	0.5742
Lead	-4.510	-4.269	-3.297	-3.490	-3.33	1.14	13	12	3.104	0.1909	0.36	0.1909
Mercury	-9.210	-9.210	-9.210	-9.210	-8.55	1.09	13	12	2.100	0.0007	0.00081	0.0007
Nickel	-3.219	-3.912	-2.477	-2.666	-2.93	1.70	13	12	2.865	0.9241	0.86	0.8600
Zinc	-2.207	-2.040	-1.427	-1.448	-1.29	1.09	13	12	3.004	1.2719	2.8	1.2719

All results are reported in units of mg/L.

U - This compound was analyzed but not detected. The numerical value represents one-half the quantitation limit of the compound.

J - This result should be considered a quantitative estimate.

UJ - This compound was analyzed but not detected. The numerical value that represents one-half the quantitation limit of the compound is a quantitative estimate.

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95% Upper Confidence Limit Calculation for Volatile Organics Data for Deep Off-Site Ground Water Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-WS-MW-1 AVG-	DUP	GL-WS-I	vIW-2	GL-WS-M	W-3	GL-WS-N	√W-3	MW	-1	MW	-2	MW	<u>-3</u>
Date Collected	7/24/96		7/23/	96	7/24/9	6	1/8/9	7	11/10	/98	11/10	/98	11/10)/98
Volatile Organics														
Acetone	5.65	J	13	J	37		480	J	10	U	10	U	10	U
4-Methyl-2-pentanone	10	U	10	U	3.2	J	170	J	10	U	10	U	10	U

LOG	TRA	NSFORM	JED	DATA

Sample Location	GL-WS-MW-1 AVG-DUP	GL-WS-MW-2	GL-WS-MW-3	GL-WS-MW-3	MW-1	MW-2	MW-3		Std				95%	Max	Lower of 1
Date Collected	7/24/96	7/23/96	7/24/96	1/8/97	11/10/98	11/10/98	11/10/98	Mean	Dev	N	N-1	H stat	UCL	Conc	Conc vs. l
Volatile Organics						-		-							
Acetone	1.732	2.565	3.611	6.174	2.303	2.303	2.303	3.00	1.51	7	6	5.219	1572.3	480	480
4-Methyl-2-pentanone	2.303	2.303	1.163	5.136	2.303	2.303	2.303	2.54	1.22	7	6	4.336	231.6	170	170

U - This compound was analyzed but not detected. The numerical value represents one-half the quantitation limit of the compound.

J - This result should be considered a quantitative estimate.

All results reported in units of ug/L.

Table B-14
95% Upper Confidence Limit Calculation for Semivolatile Organics Data for Deep Off-Site Ground Water
Greiner's Lagoon Site, Fremont Ohio

Sample Location Date collected	GL-WS-MW-1 AV 7/24/96	G-DUP	GL-WS-M 7/23/9		GL-WS-MV 7/24/96		MW-1 11/10/98		MW-2 11/10/98		MW-3 11/10/98								
Semivolatile Organics	., =1, ,0		,, 42,		7/24/70		11/10/70		11/10/10		11/10/70	_							
Phenol	5	U	5	υ	5	U	2.8	J	5	υ	5	บ							
bis(2-Ethylhexyl) phthalate	6.15	J	2.2	J	7.4	j	7.9	В	6.9	B	15	B							
LOG TRANSFORMED DATA												_							
Sample Location	GL-WS-MW-1 AV	G-DUP	GL-WS-M	W-2	GL-WS-MV	V-3	MW-1		MW-2	-	MW-3		Std				95%	Max	Lower of N
Date collected	7/24/96		7/23/9	6	7/24/96)	11/10/98	ļ	11/10/98		11/10/98	Men	ı Dev	N	N-1	H stat	UCL	Conc	Concivii. U
Semwolatile Organics																			
Phenol	. 1.609		1.609		1.609		1.030		1.609		1.609	1.51	0.24	6	5	2.127	5.8	2.8	2.8

2.067

1.932

2.708

1.89 0.62 6 5 2.953 18.2 7.4

7.4

2.001

Notes:

All results are reported in units of ug/L.

bis(2 Ethylhexyl) phthalate

0.788

1.816

U - This compound was analyzed but not detected. The numerical value represents one-half the quantitation limit of the compound.

J- This result should be considered a quantitative estimate.

1 avie B-15
95% Upper Confidence Limit Calculation for Metals Data for Deep Off-Site Ground Water
Greiner's Lagoon Site, Fremont Ohio

Sample Location	GL-WS-MW-1 AVG	-DUP	GL-WS-M	W-2	GL-WS-M	W-3	MW-1	MW-2	MW-3
Date Collected	7/24/96		7/23/9	6	7/24/9	6	11/10/98	11/10/98	11/10/98
Metals									
Lead	0.0015	U	0.004		0.0044		0.0052	0.0099	0.014
Zinc	0.025	U	0.025	U	0.025	U	0.055	0.080	0.061

Sample Location C	GL-WS-MW-1 AVG-DUP	GL-WS-MW-2	GL-WS-MW-3	MW-1	MW-2	MW-3		Std			95%	Max	Lower of Max
Date Collected	7/24/96	7/23/96	7/24/96	11/10/98	11/10/98	11/10/98	Mean	Dev	N N	1 H stat	UCL	Conc	Conc vs. UCL
Metals													
Lead	-6.502	-5.521	-5.426	-5.259	-4 .615	-4.269	-5.27	0.78	6 5	3.414	0.023	0.014	0.014
Zinc	-3.689	-3.689	-3.689	-2.900	-2.526	-2.797	-3.21	0.53	6 5	2.723	0.089	0.080	0.080

Notes:

All results are reported in units of mg/L.

U - This compound was analyzed but not detected. The numerical value represents one-half the quantitation limit of the compound.

Appendix K Supplemental Field Investigation Sampling Analytical Results

Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

Analytical Quality Assurance Report for Ground Water and Soil Samples Collected 3 November through 11 November 1998 In Association with the Engineering Evaluation/Cost Analysis (EE/CA) Site Investigation

23 February 1999

Environmental Resources Management, Inc.

855 Springdale Drive Exton, Pennsylvania 19341 File No.: 09928.00.01 Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

Analytical Quality Assurance
Report for Ground Water and
Soil Samples Collected 3 November
through 11 November 1998
In Association with the
Engineering Evaluation/Cost Analysis
(EE/CA) Site Investigation

23 February 1999

Purshotam I. Batra

Quality Assurance Task Manager

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Quality Assurance Manager

Environmental Resources Management, Inc.

855 Springdale Drive Exton, Pennsylvania 19341 File No.: 09928.00.01

TABLE OF CONTENTS

1.0	INT	RODUCT	ION	1
2.0	ORC	GANIC DA	ATA	4
	2.1	ORGA1	NIC DATA QUALIFIERS	4
		2.1.1	Ground Water Samples	4
		2.1.2	•	(
3.0	INO.	RGANIC	DATA	:
	3.1	INORG	SANIC DATA QUALIFIERS	
		3.1.1	Ground Water Samples	
		3.1.2	Soil Samples	8
4.0	SUM	MARY		9
ATTA	.СНМ	ENTS		
1 2			OGY SUMMARY AND METHOD REFERENCES ARY TABLES	
LIST	OF TA	BLES		

TABLE 1-1 SUMMARY OF SAMPLING DATA REVIEWED

2

INTRODUCTION

This analytical quality assurance report is based upon a review of analytical data generated for ground water and soil samples and associated quality control samples collected from 3 November 1998 through 11 November 1998 at the Lubrizol Corporation, Greiner's Lagoon Site located in Sandusky County, Ohio as part of the Engineering Evaluation/Cost Analysis (EE/CA) Site Investigation. The analytical methods which were used in these analyses are summarized and referenced in Attachment 1. The sample locations, laboratory sample identification numbers, dates of collection, and analyses performed are presented on Table 1-1. Data summary tables presenting the validated and/or qualified analytical results are provided in Attachment 2.

The analytical data were reviewed for adherence to the specified analytical protocols. The reported results for organic and inorganic analyses have been validated or qualified using general guidance provided by the "National Functional Guidelines for Organic (and Inorganic) Data Review", USEPA, 2/94 (and 2/94).

Table 1-1

Summary of Sampling Data Reviewed

Ground Water and Soil Sampling November 1998

The Lubrizol Corporation

Greiner's Lagoon Site

Sandusky County, Ohio

Sample		Date	Analyses
Location	Matrix	Sampled	Performed
MW-1	Aqueous	11/10/98	[1], [2], [3]
MW-2	Aqueous	11/10/98	[1], [2], [3]
MW-3	Aqueous	11/10/98	[1], [2], [3]
MW-4	Aqueous	11/11/98	[1], [2], [3]
MW-5	Aqueous	11/11/98	[1], [2], [3], [4]
MW-6	Aqueous	11/11/98	[1], [2], [3]
MW-7	Aqueous	11/11/98	[1], [2], [3]
MW-8	Aqueous	11/11/98	[1], [2], [3]
MW-9	Aqueous	11/11/98	[1], [2], [3]
MW-10	Aqueous	11/11/98	[1], [2], [3]
MW-11	Aqueous	11/11/98	[1], [2], [3]
MW-12	Aqueous	11/11/98	[1], [2], [3]
MW-13	Aqueous	11/11/98	[1], [2], [3]
MW-13	Aqueous	1/20/98	[1]
MW-13	Aqueous	1/28/98	[1]
SWS*	Aqueous	1/28/98	[1]
MW-14	Aqueous	11/11/98	[1], [2], [3]
MW-13 (8-10')	Soil	11/3/98	[1], [2], [3], [4]
Duplicate 1	Aqueous	11/11/98	[1], [2], [3]
Duplicate 2	Aqueous	11/11/98	[1], [2], [3]

^{[1] =} Volatile Organic Compounds: Selected Target Compound List (TCL).

^{[2] =} Semivolatile Organic Compounds: Selected TCL.

^{[3] =} Metals: Selected Target Analyte List (TAL).

^{[4] =} Moisture Content.

^{[*] =} This sample is a blind field duplicate of sample MW-13 collected on 28 January 1999.

Table 1-1

Summary of Sampling Data Reviewed (Continued)
Quality Control (QC) Sampling November 1998
The Lubrizol Corporation
Greiner's Lagoon Site
Sandusky County, Ohio

Sample Location	Mairix	Date Sampled	Analyses Performed
Equipment Blank 1	Aqueous	11/11/98	[1], [2], [3]
Equipment Blank 2	Aqueous	11/11/98	[1], [2], [3]
Trip Blank	Aqueous	11/11/98	[1]
Trip Blank	Aqueous	11/11/98	[1]
Trip Blank	Aqueous	11/11/98	[1]

^{[1] =} Volatile Organic Compounds: Selected Target Compound List (TCL).

^{[2] =} Semivolatile Organic Compounds: Selected TCL.

^{[3] =} Metals: Selected Target Analyte List (TAL).

The organic analyses of sixteen ground water samples and one soil sample, and their associated field quality control samples were performed by Quanterra Environmental Services of North Canton, Ohio. The samples were analyzed for selected volatile and semivolatile organic compounds, as indicated in Table 1-1. All sample analyses were performed according to the protocols specified in "Test Methods for Evaluating Solid Waste", SW-846, Third Edition, November 1986, updated July 1992. The methods used for these analyses are summarized and referenced in Attachment 1.

The findings offered in this report are based on a review of data generated according to a full data deliverables format for all samples. The following deliverables were evaluated for conformance with criteria: chain of custody documentation, holding times, laboratory method and travel blank analysis results, surrogate compound recoveries, matrix spike compound recoveries and reproducibility, bromofluorobenzene (BFB) and decafluorotriphenylphosphine (DFTPP) mass tuning results, initial and continuing calibration summaries, and internal standard performance summaries.

The organic analyses were performed acceptably, but require qualifying statements. It is recommended that the reported analytical results be used only with the qualifying statements provided in this report. Any aspects of the data which are not discussed in this report should be considered qualitatively and quantitatively valid as reported, based on the deliverables reviewed. Data summary tables presenting the validated and qualified results are provided in Attachment 2.

2.1 ORGANIC DATA QUALIFIERS

2.1.1 Ground Water Samples

The positive results reported for semivolatile organic compound bis (2-ethylhexyl)phthalate are considered qualitatively invalid in the ground water samples MW-1, MW-2, and MW-3 due to the levels at which this compound was present in the associated laboratory method and/or field blanks. USEPA protocol requires that positive results for common laboratory contaminants, such as bis (2-ethylhexyl)phthalate that are less than or equal to ten times the laboratory method and/or field blanks contamination levels be qualified as qualitatively invalid. This has been indicated by placing

- "B" qualifiers next to the reported quantitative results on the data summary table for this compound in these ground water samples.
- The quantitation limit for acetone in ground water sample MW-13 collected on 20 January 1999 should be considered a quantitative estimate. The initial calibration relative response factor (RRF) for this compound was less than the quality control limit of 0.050 for the standard associated with this sample analysis. This low response factor indicates a lack of instrument sensitivity for acetone. This has been indicated on the data summary table by placing a "J" qualifier next to the quantitation limit for acetone in this sample. However, the possibility of elevated quantitation limit should be noted when assessing this sample for the quantitative absence of acetone.
- The ground water samples listed on the table on page 6 were analyzed for volatile and semivolatile organic compounds (VOCs and SVOCs) at initial dilutions because of suspected chromatographic interferences present in these samples. The initial dilutions were required to prevent saturation of the instrument and to allow adequate chromatographic resolution and quantitation of the compounds within the linear calibration range of the instrument. However, higher quantitation limits have resulted for volatile and semivolatile organic compounds which were not detected in these samples. This should be noted when assessing these samples for the qualitative absence of specific volatile and semivolatile organic compounds.

Sample	Fraction	Dilution Factor
MW-5	VOCs	, 5X
MW-6	VOCs	20X
MW-13	VOCs	33X
MW-4	SVOCs	5X
MW-5	SVOCs	10X
MW-6	SVOCs	25X
MW-7	SVOCs	10X
MW-8	SVOCs	4X
MW-9	SVOCs	20X
MW-10	SVOCs	10X
MW-11	SVOCs	10X
MW-12	SVOCs	10X
MW-13	SVOCs	20X
MW-14	SVOCs	10X
Duplicate 1	SVOCs	5X
Duplicate 2	SVOCs	20X

 As required by USEPA protocols, all compounds which were qualitatively identified at concentrations below their respective method quantitation limits (MQLs) have been marked with "J" qualifiers on the data summary tables to indicate that they are quantitative estimates.

2.1.2 Soil Sample

• The positive result reported for volatile organic compound acetone are considered qualitatively invalid in the soil sample MW-13 (8-10') due to the levels at which this compound was present in the associated laboratory method and/or field blanks. USEPA protocol requires that positive results for common laboratory contaminants, such as acetone that are less than or equal to ten times the laboratory method and/or field blanks contamination levels be qualified as qualitatively invalid. This has been indicated by placing a "B" qualifier next to the reported quantitative result on the data summary table for acetone in this soil sample.

The inorganic analyses of the sixteen ground water samples and one soil sample, and their associated field quality control samples were performed by Quanterra Environmental Services of North Canton, Ohio. These samples were analyzed for selected total metals as indicated in Table 1-1. All sample analyses were performed according to the protocols specified in "Test Methods for Evaluating Solid Waste", SW-846, Third Edition, November 1986, updated July 1992. The methods used for these analyses are summarized and referenced in Attachment 1.

The findings in this report are based on a review of the data generated according to a full data deliverables format. The following deliverables were evaluated for conformance with criteria: chain of custody documentation, holding times, laboratory method blank results, matrix spike recoveries, detection limits/sensitivity, initial and continuing calibrations, laboratory control sample results, Inductively Coupled Plasma (ICP) Emission Spectroscopy interference check sample results, ICP serial dilution results, and Graphite Furnace Atomic Absorption (GFAA) Spectroscopy post-digestion spike recoveries.

The inorganic analyses were performed acceptably, but require qualifying statements. It is recommended that the analytical results be used only with the qualifying statements provided in this report. Any aspects of the data which are not discussed in this report should be considered qualitatively and quantitatively valid as reported, based on the deliverables reviewed. Data summary tables presenting the validated and qualified results are provided in Attachment 2.

3.1 INORGANIC DATA QUALIFIERS

3.1.1 Ground Water Samples

• The detection limits reported for selenium in all ground water samples, and copper in ground water samples MW-1, MW-2, MW-3, MW-5, MW-10, and MW-11 are a quantitative estimate and may be higher than reported due to negative response for these analytes in associated laboratory initial and continuing calibration blanks. The negative response for these blanks indicate the possibility of underestimation of the actual analyte concentration by the instrument. The detection limits for selenium and copper in these sample have been marked with a "J" qualifier to indicate they are biased low quantitative estimates.

The positive results and/or detection limits reported for arsenic and selenium in all ground water samples should be considered biased low quantitative estimates and may be higher than reported. The associated matrix spike recoveries were below the established quality control (QC) limit for these analytes. The low recoveries indicate the presence of matrix interferences in samples of a similar matrix. This has been indicated by placing "J" qualifiers next to the positive results and/or detection limits for these analytes on the data summary table. The possibility of elevated detection limits should be noted when assessing the data for the qualitative absence of arsenic and selenium in these samples.

3.1.2 Soil Samples

- The positive results and/or detection limits reported for arsenic, selenium, and antimony in soil sample MW-13 (8-10') should be considered biased low quantitative estimates and may be higher than reported. The associated matrix spike recoveries were below the established quality control (QC) limit for these analytes. The low recoveries indicate the presence of matrix interferences in samples of a similar matrix. This has been indicated by placing "J" qualifiers next to the positive results and/or detection limits for these analytes on the data summary table. The possibility of elevated detection limits should be noted when assessing the data for the qualitative absence of arsenic and selenium in these samples.
- The positive results reported for chromium, nickel, and lead in the soil sample MW-13 (8-10') should be considered quantitative estimates. The ICP serial dilution analysis results associated with this sample exceeded the established precision criteria of 10 percent difference for these analytes. The poor precision indicates the possible presence of physical or chemical interference in the analysis of samples of a similar matrix. This has been indicated by placing "J" qualifiers next to the reported quantitative results chromium, nickel, and lead in this sample.

4.0 SUMMARY

The organic and inorganic analyses were performed acceptably, but required a few qualifying statements. This analytical quality assurance report has identified the aspects of the data which required qualification. A support documentation package has been prepared for this quality assurance review and is located with the Lubrizol Corporation project file.

Attachment 1 Methodology Summary and Method References

METHODOLOGY SUMMARY

Analysis for Volatile Organic Compounds by GC/MS

Soil samples were analyzed for volatile organic compounds by adding a five-gram (wet weight) sample aliquot to 5 milliliters (mL) of reagent water containing surrogate compounds and internal standards. Aqueous samples (5 mL) were fortified directly with surrogate compounds and internal standards for analysis. The soil or water samples were then purged with helium at ambient temperature. The volatile compounds were transferred from the aqueous phase to the vapor phase and trapped onto a sorbent column. After purging, the column was heated and back flushed to desorb the compounds onto a gas chromatographic column. The gas chromatograph was temperature programmed to separate the sample components, which were then detected by a mass spectrometer. The target compounds were qualitatively identified and quantitated through calibration with standards.

Analysis for Semivolatile Organic Compounds by GC/MS

Thirty grams (wet weight) of soil were extracted with 1:1 methylene chloride and acetone. Aqueous samples (1000 mL) were adjusted to the appropriate pH and extracted with methylene chloride. The extracts were then filtered, dried, and concentrated to the appropriate volume. The extracts were then analyzed by first separating the extract components using a gas chromatographic column and then detecting them with a mass spectrometer for qualitative and quantitative evaluation.

Analysis for ICP Metals

Prior to analysis, 100- milliliter or one gram sample aliquots were digested with nitric and hydrochloric acids for aqueous analysis. The solution resulting from the metals digestion was analyzed by Inductively Coupled Plasma (ICP) Emission Spectroscopy.

Analysis for Arsenic and Selenium,

One hundred-milliliter sample or one gram sample aliquots were digested with nitric and hydrogen peroxide for aqueous analysis. The resulting solutions were analyzed by graphite furnace atomic absorption (GFAA).

Analysis for Mercury

Aqueous and solid samples analyzed for mercury were oxidized with potassium permanganate. Mercury was reduced to its elemental form and aerated from solution in a closed system. Mercury was then determined with a cold vapor atomic absorption spectrophotometer.

METHOD REFERENCES

Analysis	References
Volatile Organic Compounds	Test Methods for Evaluating Solid Wastes, SW-846, 3rd Edition, (USEPA 1986), Method 8240A.
Semivolatile Organic Compounds	Test Methods for Evaluating Solid Wastes, SW-846, 3rd Edition, (USEPA 1986), Method 8270A.
Total Metals	Test Methods for Evaluating Solid Wastes, SW-846, 3rd Edition, (USEPA 1986, updated July 1992), Methods 6010A, 7060, 7470, 7471, and 7740.

Attachment 2 Data Summary Tables

Aqueous A tical Results Volatile Organic Compounds-Indicator Chemicals The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		MW-1		MW-2		MW-3		MW-4		MW-5		MW-6		MW-7	Т	MW-8		MW9		MW-10		MW-11	
DEPTH:	,	N/A		N/A	ŀ	N/A		N/A		N/A		N/A	- 1	N/A	1	N/A		N/A	ſ	N/A	- 1	N/A	- (
DATE COLLECTED:		11/10/98		11/10/98	ļ	11/10/98	1	11/11/98		11/11/98		11/11/98		11/11/98	1	11/11/98		11/11/98	Į	11/11/98	ļ	11/11/98	;
MATRIX:		Aqueous		Aqueous		Aqueous		Aqueous		Aqueous		Aqueous		Aqueous	١	Aqueous		Aqueous		Aqueous	- 1	Aqueous	- [
MOISTURE CONTENT:		N/A		N/A		N/A		N/A		N/A		N/A		N/A	١	N/A		N/A	l	N/A	- }	N/A	ļ
ANALYTE	UNITS														Т								
1,1-Dichloroethene	μg/L	5.0	U	5.0	υį	5.0	U	5.0	U	25	U	100	U	5.0 t	1	5.0	U	5.0	υ	5.0	U	5.0	U
Trichloroethene	μg/L	5.0	บ	5.0	U	5.0	U	5.0	U	25	U	100	U	5.0 t	J	5.0	U	5.0	υ	5.0	U	5.0	υ
Chlorobenzene	μg/L	5.0	υ	5.0	บ	5.0	บ	5.0	ប	25	U	100	U	5.0 t	,	5.0	U	5.0	υ	5.0	U	5.0	υ
Acetone	μg/L	20	U	20	U	20	υ	8.3	J	500		1400		19 J	П	6.3	J	16	J	10	J	11	J
Benzene	μg/L	5.0	U	5.0	U	5.0	U	1.6	J	63		18	J	23	1	1.3	J	5.0	υĺ	5.0	บ	5.0	υĺ
2-Butanone	μg/L	20	U	20	υ	20	υ	20	U	77	J	400	U	20 i	J	20	U	20	U	20	U	20	U
Ethylbenzene	μg/L	5.0	บ	5.0	U	5.0	บ	5.0	บ	5.7	J	100	บ	5.0 t	J [5.0	υ	5.0	ប	5.0	υſ	5.0	U
4-Methyl-2-pentanone	μg/L	20	Ü	20	υ	20	υ	20	U	80	J	600		j 20 ι	J	20	U	3.7]	20	υ	20	υ
Toluene	μg/L	5.0	υ	5.0	υ	5.0	υ	5.0	U	8.5	J	100	บ	5.0 t	J.	5.0	U	5.0	U	5.0	U	5.0	U
Xylene (total)	μg/L	5.0	บ	5.0	Ū	5.0	ט	5.0	U	11	J	100	U	5.0 t	7	5.0	U	5.0	U	5.0	U	5.0	ט
		L								L		<u> </u>		<u> </u>									

- J This result should be considered a quantitative estimate.
- B This result is qualitatively invalid since this compound was detected in a blank at similar concentration.
- U This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.
- UJ This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitive estimate.

SWS-A - Shallow Water Sample - A.

- *- This water sample is a blind field duplicate of sample MW-13 collected on 28 January 1999.
- ** This is a soil samples and the concentrations are expressed in ug/Kg units.

N/A - Not applicable.

Aqueous Am., ytical Results Volatile Organic Compounds-Indicator Chemicals The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		MW-12		MW-13		MW-13		MW-11		HMR V.		MW-14	T	Duplicate 1	T	Duplicate 2		MW:13**	П	Fquipment Blank		Equipment Blan	A I
DIPIH		N/A		N/A		N/A		N/A		N/A		N/A	-	N/A	ı	N/A		(# 10°)	- 1	N/A		N/A	
DATE COLLECTED:		11/11/98		11/11/98		1/20/99		1/28/99		1/28/99		11/11/98	-	11/11/96	١	11/11/98		11/1/98	- 1	11/11/9#		11/11/98	
MATRIX		Aqueous		Aqueque		Aqueous		Aqueous		Aquenus		Aquenus	-	Aqueous	1	Ациевць		Soft	J	Λημεσιμέ		Aqueous	
MOINTURE CONTENT:		N/A		N/A		N/A		N/A		N/A		N/A	-1	N/A	1	N/A	J	N/A	- 1	N/A		N/A	
ANALYTE	UNITS												T		1		寸						
1,1-1)x hiproethene	μg/L	50	U	170	U	5.0	U	50	U	5.0	U	5.0	U	50 t	υ	50	U	750	U	5 0	U	5.0	tr
Tric hlaraethene	μg/L	50	U	170	U	5.0	U	50	U	50	υ	5.0	u	50 t	U.	5.0	U	750	U	5.0	U	5.0	U
L hlarahenzene	μg/L	50	U	170	U	5 0	u	50	U	50	U	50	u	50 t	U	50	U	750	u	5 0	U	5 0	17
Acetone	μg/L	19	- 1	4000		20	Uj	20	U	20	U	20	U	20 t	υ	440		6400	В	20	U	20	U
Henzene	μg/t	5.0	U	170	U	50	U	5.0	IJ	10	U	50	υĹ	50 t	υŧ	57	l	750	υ	5.0	U,	50	ţ:
2 Butanone	μg/t	20	U	670	U	20	U	20	ţj	30	IJ	20	u	20 t	υĮ	72	1	1000	U	70	U	20	P
Fihyllwnsone	μg/t.	5.0	U	170	U	50	ţį	50	ŧ	50	ij	5.0	u	50 t	υĮ	4.7	ᆀ	750	U	50	U	50	ţ:
4 Methyl-2-pentanone	μg/1	15	J	670	U	20	U	70	U	20	U	20	υ	20 t	ᅵ	45	-1	3000	U	20	£1	20	ti
Intuene	μg/t.	5.0	U	170	u	50	U	1 21	B	0 68	В	50	미	50 t	u	E 4	ᆲ	750	IJ	5 0	U	10	11
Sylene (total)	μg/L	5.0	u	170	U	3 0	υ	50	u	5.0	U	50	υ	50 t	IJ	10	ᆲ	750	U	5 0	U	5.0	11
1													- 1		1		- 1						

- J This result should be considered a quantitative estimate
- B. This result is qualifatively invalid since this compound was detected in a blank at similar concentration
- U. This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound
- U). This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitive estimate.

SWS-A. Shallow Water Sample - A.

- *. This water sample is a blind field duplicate of sample MW-13 collected on 28 January 1999
- ** . This is a soil samples and the concentrations are expressed in ug/Kg units

N/A - Not applicable

Aqueous A. _ytical Results Volatile Organic Compounds-Indicator Chemicals The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		Trip Blank		Trip Blank		Trip Blank		Trip Blank	
DEPTH:		N/A		N/A		N/A		N/A	
DATE COLLECTED:		11/11/98		11/11/98		11/11/98		1/20/99	
MATRIX:		Aqueous		Aqueous		Aqueous	1	Aqueous	
MOISTURE CONTENT:	_	N/A		N/A		N/A		N/A	
ANALYTE	UNITS								
1,1-Dichloroethene	μg/L	5.0	U	5.0	U	5.0	U	5.0	U
Trichloroethene	μg/L	5.0	U	5.0	U	5.0	U	5.0	\boldsymbol{v}
Chlorobenzene	μg/Ľ	5.0	υ	5.0	U	5.0	U	5.0	U
Acetone	μg/L	20	U	20	υ	20	υ	20	U
Benzene	μg/L	5.0	U	5.0	บ	5.0	บ	5.0	U
2-Butanone	μg/L	20	U	20	U	20	υ	20	U
Ethylbenzen e	μg/L	5.0	υ	5.0	υ	5.0	υ	5.0	υ
4-Methyl-2-pentanone	μg/L	20	U	20	U	20	U	20	U
Toluene	μg/L	5.0	U	5.0	U	5.0	U	5.0	U
Xylene (total)	μg/L	5.0	U	5.0	U	5.0	U	5.0	U
		Ĺ							

Analythmi Results Semivolatile Organic Compounds-Indicator Chemicals The Lubrizol Corporation Greiner's Lagoon Site

Sandusky County, Ohio

SAMPLE LOCATION:		MW-1		MW-2		MW-3		MW-4		MW-5		MW-6		MW-7		MW-8	
DEPTH:		N/A	- 1	N/A		N/A		N/A		N/A		N/A		N/A		N/A	
DATE COLLECTED:		11/10/ 98	l l	11/10/98		11/10/98		11/11/98		11/11/98		11/11/98		11/11/98		11/11/98	
MATRIX:	Į.	Aqueous		Aqueous		Aqueous		Aqueous		Aqueous		Aqueous		Aqueous		Aqueous	
MOISTURE CONTENT:		N/A		N/A	_	N/A		N/A		N/A		N/A		N/A		N/A	
ANALYTE	UNITS		1														
Acenaphthene	μg/l.	10	υ	10	υ	10	U	50	υ	100	U	250	U	100	U	40	U
2,4-Dinitrotoluene	μg/t.	10	υļ	10	υ	10	U	50	U	100	U	250	U	100	U	40	U
Pyrene	μχ/1.	10	υ	10	U	10	U	50	U	100	U	250	IJ	100	U	40	U
N-Nitrosodi-n-propylamine	μg/L	10	U	10	υ	10	U	50	U	100	U	25 0	U	100	IJ	40	U
1,4-Dichlorobenzene	μg/l.	10	υĮ	10	U	10	υ	50	U	100	U	250	U	100	U	40	U
l'entchlorophenol	μg/t.	10 .	υĮ	10	U	10	υ	50	U	100	U	250	U	100	ม	40	U
2-Chlorophenol	μg/L	10	υļ	10	บ	10	U	50	U	100	U	250	IJ	100	IJ	40	U
4-Chloro-3-methylphenol	μg/L	10	υļ	10	υ	10	υ	50	U	100	U	250	U	100	IJ	40	U
4 Nitrophenol	μg/l.	50	ט	50	υ	50	U	250	υ	500	U	1250	U	500	IJ	200	υ
bis(2-Ethylhexyl) phthalate	μg/L	7 4	В	6.9	В	15	В	50	υ	100	υ	250	U	100	υ	40	υJ
1,2-Dichlorobenzene	μg/1.	10	υ	10	U	10	υ	50	υ	100	U	250	U	100	υ	40	U
Fluoranthene	μg/L	10	υ	10	υ	10	υ	50	U	100	U	250	U	100	U	40	U
Isophorone	μg/T.	10	υ	10	υ	10	υ	50	U	100	U	250	U	100	U	40	U
2 Methylnapthalene	μg/L	10	υļ	10	υ	10	υ	50	U	100	U	250	U	100	U	40	U
2 Methylphenol	μg/L	10	υ	10	υ	10	υ	50	U	100	U	250	U	100	U	40	υ
4 Methylphenol	μg/L	10	υļ	10	υ	10	U	50	υ	100	U	250	U	100	υ	40	υ
Napthalene	μg/L	10	υ	10	U	10	υ	50	U	100	υ	250	υ	100	U	40	U
Phenol	μg/L	28	J	10	U	10	U	50	U	100	U	1400		100	U	40	U
1,2,4-Trichlorobenzene	μg/L	10	U	10	U	10	U	50	U	100	U	250	U	100	U	40	U
l	j		l l							İ		L				<u> </u>	

J - This result should be considered a quantitative estimate.

N/A - Not applicable.

B - This result is qualitatively invalid since this compound was detected in a blank at similar concentration.

U - This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.

UJ - This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitive estimate.

⁻ This is a soil sample and the concentrations are expressed in ug/Kg units.

Analytical Results Semivolatile Organic Compounds-Indicator Chemicals The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		MW9		MW-10		MW-11		MW-12		MW-13		MW-14		Duplicate 1		Duplicate 2		MW-13**	
DEPTH:	ļ	N/A	- 1	N/A		N/A		N/A	1	N/A		N/A		N/A		N/A		(8-10')	
DATE COLLECTED:		11/11/98		11/11/98		11/11/98	- 1	11/11/98	ĺ	11/11/98	- 1	11/11/98		11/11/98		11/11/98		11/3/98	i
MATRIX:		Aqueous		Aqueous		Aqueous		Aqueous	1	Aqueous		Aqueous		Aqueous		Aqueous		Soil	1
MOISTURE CONTENT:		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
ANALYTE	UNITS																		
Acenaphthene	μg/L	200	U	100	υ	100	บ	100	υ	200	U	100	U	50	υ	200	U	460	ט
2,4-Dinitrotoluene	μg/L	200	U	100	υ	100	U	100	U	200	U	100	υ	50 .	U	200	บ	460	U
Pyrene	μg/L	200	ן ט	100	υ	100	ַע	100	U	200	υ	100	υ	50	U	200	U	460	U
N-Nitrosodi-n-propylamine	μg/L	200	υļ	100	υ	100	U	100	U	200	U	100	U	50	U	200	υ	460	υ
1,4-Dichlorobenzene	μg/L	200	יט	100	U	100	U	100	υ	200	U	100	U	50	υ	200	U	460	บ
Pentchlorophenol	μg/L	200	υ	100	ប	100	U	100	υ	200	ט	100	U	50	υ	200	υ	460	U
2-Chlorophenol	μg/L	200	יט	100	υ	100	υ	100	υ	200	บ	100	U	50	U	200	U	460	υ
4-Chloro-3-methylphenol	μg/L	200	יט	100	U	100	υ	100	U	200	U	100	U	50	U	200	U	460	U
4-Nitrophenol	μg/L	1000	υ	500	υ	500	U	500	υ	1000	U	500	U	250	υ	1000	U	2300	U
bis(2-Ethylhexyl) phthalate	μg/L	200	ן ט	100	ប	100	ប	100	ប	200	U	100	U	50	U	200	ַט	460	U
1,2-Dichlorobenzene	μg/L	200	U	100	U	100	U	100	υ	200	υ	100	U	50	U	200	U	460	ט
Fluoranthene	μg/L	200	υ	100	υ	100	บ	100	υ	200	U	100	U	50	U	200	U	460	יט
Isophorone	μg/L	200	יט	100	υ	100	υ	100	Ų	200	บ	100	U	50	υ	200	U	460	บ
2-Methylnapthalene	μg/L	200	U	100	U	100	บ	100	บ	200	υ	100	U	50	υ	200	บ	460	υj
2-Methylphenol	μg/L	200	ן ט	100	υ	100	U	100	υ	200	U	100	U.	50	U	200	บ	460	ប
4-Methylphenol	μg/L	200	υ	100	บ	100	υ	100	ט	200	υ	100	U	50	ប	200	บ	460	U
Napthalene	μg/L	200	יט	100	บ	100	υ	100	U	200	U	100	U	50	U	200	υ	460	υ
Phenol	μg/L	200	ับ	100	U	100	υ	100	U	200	υ	100	U	50	U	200	υ	460	υ
1,2,4-Trichlorobenzene	μg/L	200	ับ	100	U	100	υ	100	υ	200	บ	100	U	50	U	200	บ	460	υ
						L				<u></u>		<u> </u>		<u> </u>				L	

- J This result should be considered a quantitative estimate.
- B This result is qualitatively invalid since this compound was detected in a blank at similar concentration.
- U This compound was analyzed but not detected. The numerical value represents the quantitation limit of the compound.
- UJ This compound was analyzed but not detected. The numerical value that represents the quantitation limit of the compound is a quantitive estimate.
- * This is a soil sample and the concentrations are expressed in ug/Kg units.

N/A - Not applicable.

Analytical Results Semivolatile Organic Compounds-Indicator Chemicals The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		Equipment Blank 1		Equipment Blank 2	
DEPTH:		N/A	j	N/A	
DATE COLLECTED:		11/11/98	İ	11/11/98	
MATRIX:		Aqueous		Aqueous	
MOISTURE CONTENT:		17%		N/A	
ANALYTE	UNITS				
Acenaphthene	μg/L.	10	υ	10	υ
2,4-Dinitrotoluene	μg/L	10	U	10	U
l'yrene	μg/L	10	υ	10	U
N-Nitrosodi-n-propylamine	μg/L	10	U	10	U
1,4-Dichlorobenzene	μg/L	10	U	10	U
l'entchlorophenol	μg/L	10	U	10	U
2-Chlorophenol	μ g/1.	10	U	10	U
4-Chloro-3-methylphenol	μg/l.	10	υ	10	U
4-Nitrophenol	μg/l.	50	U	50	U
bin(2-Ethylhexyl) phthalate	μg/L	10	U	10	U
1,2-Dichlorobenzene	μg/l.	10	U	10	U
Fluoranthere	μg/L	10	υ	10	U
Isophorone	μg/1.	10	U	10	U
2 Methylnapthalene	μg/1.	10	U	10	U
2 Methylphenol	μg/l	10	υ	10	ι
4 Methylphenol	μg/1.	10	υ	10	ι
Napthalene	μg/L	10	υ	10	ι
Phenol	μg/t.	10	U	10	U
1.2.4-Trichlorobenzene	μg/L	10	U	10	ι

Analyte Aresults Total Metals-Indicator Chemicals The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		MW-1		MW-2		MW-3		MW-4		MW-5		MW-6		MW-7		MW-8		MW9	\neg
DEPTH:		N/A		N/A		N/A		N/A		N/A	1	N/A		N/A		N/A		N/A	
DATE COLLECTED:		11/10/98		11/10/98		11/10/98		11/11/98		11/11/98	- {	11/11/98		11/11/98		11/11/98		11/11/98	1
MATRIX:		Aqueous		Aqueous		Aqueous		Aqueous		Aqueous	ĺ	Aqueous		Aqueous		Aqueous		Aqueous	1
MOISTURE CONTENT:		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
ANALYTE	UNITS																		
Arsenic	mg/L	0.010	UJ	0.010	UJ	0.010	υJ	0.018	J	0.018	J	0.066	J	0.086	J	0.039	J	0.016	3
Mercury	mg/L	0.00020	บ	0.00020	U	0.00020	υ	0.00020	บ	0.00020	υ	0.00020	υ	0.00020	U	0.00020	U	0.00020	υ
Selenium	mg/L	0.0050	UJ	0.0050	υJ	0.0050	υJ	0.020	נט	0.0050	UJ	0.010	UJ	0.0050	υj	0.010	UJ	0.0050	UJ
Silver	mg/L	0.0050	บ	0.0050	บ	0.0050	יט	0.0050	υ	0.0050	ט	0.0050	บ	0.0050	U	0.0050	υ	0.0050	U
Beryllium	mg/L	0.0050	บ	0.0050	บ	0.0050	บ	0.0050	ט	0.0050	U	0.0050	υ	0.0050	υ	0.0050	U	0.0050	υ
Cadmium	mg/L	0.0020	ט	0.0020	U	0.0020	U	0.0020	υ	0.0020	υ	0.0020	υ	0.0020	บ	0.0020	υ	0.0020	U
Chromium	mg/L	0.0050	U	0.0050	U	0.0050	บ	0.020		0.0070	ł	0.0050	U	0.0050	U	0.0088		0.016	ł
Соррег	mg/L	0.025	UJ	0.025	UJ	0.025	υJ	0.038		0.025	υJ	0.041		0.028		0.026		0.035	1
Nickel	mg/L	0.040	U	0.040	υ	0.040	ַ ט	0.040	บ	0.040		0.040	υ	0.040	U	0.040	U	0.040	υ
Lead	mg/L	0.0052		0.0099	Į	0.014		0.013		0.0030	υ	0.0030	υ	0.0033		0.0088		0.015	
Antimony	mg/L	0.010	ប	0.010	υ	0.010	υ	0.010	ַ ט	0.010	U	0.010	U	0.010	υ	0.010	U	0.010	บ
Thallium	mg/L	0.010	บ	0.010	ט	0.010	υ	0.010	υ	0.010	U	0.010	υ	0.010	บ	0.010	บ	0.010	υ
Zinc	mg/L	0.055		0.080		0.061		0.15		0.13	ŀ	0.063		0.11		0.12		0.13	1
					[1								

J - This result should be considered a quantitative estimate.

B - This result is qualitatively invalid since this analyte was detected in a blank at similar concentration.

U - This analyte was analyzed but not detected. The numerical value represents the quantitation limit of the analyte.

UJ - This analyte was analyzed but not detected. The numerical value that represents the quantitation limit of the analyte is a quantitive estimate.

^{** -} This is a soil sample and the concentrations are expressed in mg/Kg units.

N/A - Not applicable.

Analytical Results Total Metals-Indicator Chemicals The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		MW-10		MW-11		MW-12		MW-13		MW-14		Duplicate 1		Duplicate 2		MW-13**	,
DEPTH:		N/A		N/A		N/A		N/A		N/A		N/A		N/A		(H-10°)	
DATE COLLECTED:		11/11/98		11/11/98		11/11/98		11/11/98		11/11/98		11/11/98		11/11/98		11/3/98	
MATRIX:		Aqueous	ł	Aqueous		Aqueous		Aqueous		Aqueous		Aqueous		Aqueous		Soil	
MOISTURE CONTENT:		N/A	ŀ	N/A		N/A		N/A		N/A		N/A		N/A		17%	
ANALYTE	UNITS		Ī														
Arsenic	mg/L	0 010	UJ	0 011	J	0 010	UJ	0 039	- 1	0 027	j	0.029	1	0.047	J	14.2	J
Mercury	mg/L	0 00020	U	0 00020	υ	0 00020	U	0 00020	U	0 00020	U	0 00020	υ	0 00020	U	0.12	U
Selenium	mg/L	0 010	UJ	0.010	UJ	0 020	UJ	0 010	UJ	0.010	UJ	0.010	UJ	0.0050	UJ	0.60	UJ
Silver	mg/L	0.0050	U	0 0050	บ	0 0050	U	0 0050	υ	0 0050	U	0 0050	u	0.0050	บ	0.60	U
Beryllium	mg/L	0 0050	U	0 0050	υ	0 0050	U	0.0050	υ	0.0050	υ	0 0050	υ	0.0050	U	0 60	u
Cadmium	mg/L	0.0020	υ	0 0020	U	0 0020	υ	0 0020	υ	0 0020	υ	0.0020	U	0.0020	U	0 24	U
Chromium	mg/L	0.016	ŀ	0.012		0.023		0 039	- 1	0.023		0.029	- 1	0.025		13.7)
Copper	mg/L	0.025	UJ	0.025	UJ	0.029		0.080		0.065		0.079		0.15		25 1	
Nickel	mg/L	0.040	U	0.040		0.040	υ	0.084		0.066		0.073		0.11		26.6	J
Lead	mg/L	0.0095	1	0.011		0.014		0 037		0.029		0.032		0.014		10 3	J
Antimony	mg/L	0.010	U	0.010	υ	0.010	U	0 010	U	0 010	υ	0.010	U	0.010	U	1 2	UJ
Thatlium	mg/L	0.010	U	0.010	υ	0.010	U	0 010	U	0 010	υ	0 010	U	0.010	U	1 2	U
Zinc	mg/L	0 095		0 11		0.13	- 1	0.24	1	0 21		0.26		0.30		67 N	

- J This result should be considered a quantitative estimate.
- B. This result is qualitatively invalid since this analyte was detected in a blank at similar concentration.
- U This analyte was analyzed but not detected. The numerical value represents the quantitation limit of the analyte
- UJ This analyte was analyzed but not detected. The numerical value that represents the quantitation limit of the analyte is a quantitive estimate.
- ** This is a soil sample and the concentrations are expressed in mg/Kg units.
- N/A Not applicable.

Analytical Results Total Metals-Indicator Chemicals The Lubrizol Corporation Greiner's Lagoon Site Sandusky County, Ohio

SAMPLE LOCATION:		Equipment Blank 1		Equipment Blank 1	
DEPTH:		N/A	- [N/A	
DATE COLLECTED:		11/11/98	ļ	11/11/98	
MATRIX:		Aqueous		Aqueous	
MOISTURE CONTENT:		N/A	Ĭ	N/A	
ANALYTE	UNITS	,			
Arsenic	mg/L	0.010	ט	0.010	U
Mercury	mg/L	0.00020	U	0.00020	U
Selenium	mg/L	0.0050	υ	0.0050	U
Silver	mg/L	0.0050	υ	0.0050	U
Beryllium	mg/L	0.0050	U	0.0050	U
Cadmium	mg/L	0.0020	U	0.0020	U
Chromium	mg/L	0.0050	บ	0.0050	U
Copper	mg/L	0.025	υ	0.025	υ
Nickel	mg/L	0.040	ן ט	0.040	U
Lead	mg/L	0.0030	U	0.0030	U
Antimony	mg/L	0.010	ט	0.010	U
Thallium	mg/L	0.010	υ	0.010	U
Zinc	mg/L	0.050	ט	0.050	U
			- 1		

Appendix L Agency Letters-Ecological Risk Assessment

Environmental Resources Management

855 Springdale Drive Exton, Pennsylvania 19341 (610) 524-3500 (610) 524-7335 (fax) http://www.erm.com



28 October 1996

Martha Raymond
Historic Preservation Division
Ohio Historical Society
567 East Hudson Street
Columbus, Ohio 43211

Re: Historic Property
Archeological Sites

Dear Ms. Raymond,

Environmental Resources Management, Inc., (ERM) will be conducting remediation activities, under the direction of the United States Environmental Protection Agency (U.S. EPA), at the Lubrizol Corporation Greiner Lagoon Site. The Site is located in Sandusky County, Ballville Township and can be found on the Fremont West Quadrangle, United States Geological Survey (USGS) topographic map (see enclosed map).

ERM is currently conducting a screening-level evaluation to determine whether there are any preservation issues associated with any potential action. Accordingly, the purpose of this letter is to solicit information from the Historic Preservation Division concerning the occurrence of any historic properties or archeological sites in the proximity of the area.

If there are any occurrences, ERM requests that the Division provide documentation.

Please send all correspondences concerning this matter to:

Donald F. Knorr Senior Ecologist Environmental Resources Management, Inc. 855 Springdale Drive Exton, PA 19341 Ohio Historical Society 09928.00.01 28 October 1996 Page 2

If you have any questions regarding this matter, you may contact me at (610) 524-3677.

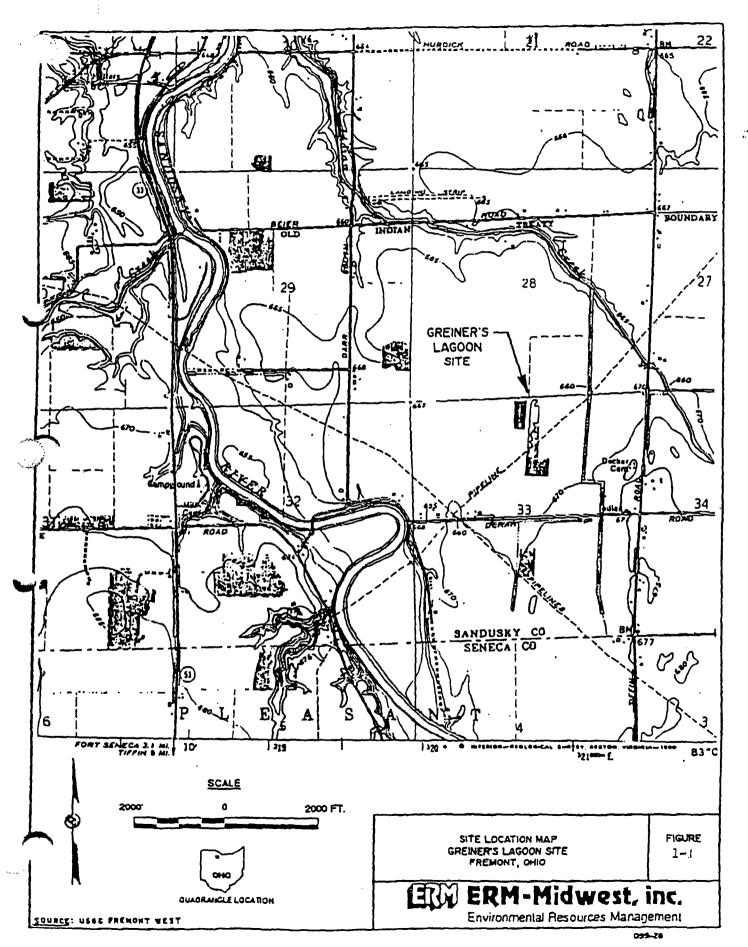
Sincerely,

Donald F. Knorr

Dorold F. Znon

Senior Ecologist

DFK/ls



Ohio Historic Preservation Office

567 East Hudson Street Columbus, Ohio 43211-1030 614/297-2470 Fax: 297-2496



November 21, 1996



Donald F. Knorr Senior Ecologist Environmental Resources Management, Inc. 855 Springdale Drive Exton, PA 19341

Dear Mr. Knorr:

RE: Lubrizol Corporation Greiner Lagoon Site, Ballville Township, Sandusky County Remediation Project

This is in response to your correspondence received October 31, 1996 concerning the proposed remediation project. The comments of the Ohio Historic Preservation Office (OHPO) are submitted in accordance with provisions of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 [36 CFR 800]). My staff has reviewed this information and I offer the following comments.

Before we can comment as to the effect this undertaking may have on any properties listed or eligible for the National Register of Historic Places, additional information is requested. Specifically, we need more detailed information about what the remediation project will entail. Will there be earth removal? Where will materials be deposited? What is the present land use and conditions? Photographs of the project area would also be of assistance in our review of the undertaking.

If you have any questions concerning this project, please contact Todd Tucky at (614) 297-2470, between the hours of 8 am. to 5 pm. E-mail queries can be sent to tmtucky@freenet.columbus.oh.us Thank you for your cooperation.

Sincerely,

Martha J. Raymond, Department Head

Technical and Review Services

MJR/TMT:tt

Environmental Resources Management

855 Springdale Drive Exton, Pennsylvania 19341 (610) 524-3500 (610) 524-7335 (fax) http://www.erm.com



31 December 1996 Reference: 09928.00.01

Ms. Martha J. Raymond Ohio Historic Preservation Office 567 East Hudson Street Columbus, Ohio 43211-1030

Dear Ms. Raymond:

This is in reply to your letter of 21 November 1996 regarding the writer's request for information on historic properties or archeological sites on in the vicinity of the Lubrizol Corporation, Greiner Lagoon Site in Sandusky County.

Your letter requested detailed information on remediation methods for the site. However, at this point of our assessment no remediation is yet planned. The purpose of our request was to gather background information which will allow informed decisions to be made during our assessment process.

If any records exists for the site in your database that provides background information, we will be most appreciative of its receipt. As our assessment progresses we will be in a better position to comply with your request for more details.

Sincerely,

Donald F. Knorr Sr. Ecologist

DFK/ls

Ohio Historic Preservation Office

567 East Hudson Street Columbus, Ohio 43211-1030 614-297-2470 Fax: 297-2496



OHIO HISTORICAL SOCIETY SINCE 1885

January 17, 1997

Donald F. Knorr Environmental Resources Management, Inc. 855 Springdale Drive Exton, PA 19341

Dear Mr. Knorr:

Re: Greiner Lagoon Site, Lubrizol Corporation, Sandusky County, Ohio

This is in response to your letter of December 31, 1996 requesting information about historic resources within an existing lagoon site. My staff has reviewed the information you provided. Based on their recommendations I have the following comments, submitted in accordance with the provision of Section 106 of the National Historic Preservation Act of 1966, as amended (36 CFR 800).

We have checked the Ohio Archaeological Inventory, the Ohio Historic Inventory and the National Register of Historic Places. Although we do not have the time or staff to conduct literature reviews which are the responsibility of the consultant, we can give you a brief overview of known cultural resources in the area. No archaeological sites or historic structures have been recorded within the boundaries of the project area. Although there has been some archaeological survey effort southwest of the project near the Sandusky River, no surveys of the project areas have been documented. Before we can offer an opinion as to whether the project will have an effect on any properties listed or eligible for the National Register of Historic Places we will need the information requested in our November 21, 1997.

If you have any questions please contact Julie Quinlan, Program Coordinator at (614) 297-2470. Thank you for your cooperation.

Sincerely,

Martha Raymond, Department Head Technical and Review Services

MJR/JAQ:jq

Environmental Resources Management, Inc.

855 Springdale Drive Exton, Pennsylvania 19341 (610) 524-3500 (610) 524-7335 (fax)

12 March 1997

Endangered Species Coordinator U. S. Fish and Wildlife Service Ohio Field Office 6950 Americana Parkway Reynoldsburg, Ohio 43068-0687



RE: Protected Species Screening Lubrizol Corporation Fremont, Ohio

Dear Sir or Madam:

Pending a decision by the United States Environmental Protection Agency (U. S. EPA), Lubrizol Corporation may be required to conduct corrective action under the Comprehensive Environmental Response, Compensation and Liability Act at the Greiner's Lagoon Site. The Site is located in Sandusky County, Ballville Township and can be found on the Fremont West Quadrangle, United States Geological Survey (USGS) topographic map.

The U. S. EPA is requiring Lubrizol Corporation to obtain information regarding protected species and their critical habitats in the proximity of the pending corrective action. Additionally, as a private entity, Lubrizol Corporation has responsibilities under Section 9 of the Endangered Species Act (ESA) not to affect listed species.

Environmental Resources Management, Inc. (ERM) is currently conducting a screening-level evaluation to determine whether there are any ESA issues associated with the pending corrective action on Lubrizol Corporation. Accordingly, the purpose of this letter is to solicit information from the Division, concerning the occurrence of any federal or state listed endangered, threatened, proposed, or candidate species or their critical habitats in the proximity of the area associated with the pending corrective action. Since the Division is the recognized authority concerning protected species and their critical habitats, ERM is leaving open, to the Division's interpretation, the geographic area of concern. To aid in this determination, ERM is enclosing a map of the Site. If there are

Ohio Division of Wildlife 09928.00.01 12 March 1997 Page 2

any occurrences, ERM requests the Division to provide a listing of state and regional protected species, or proposed species or critical habitats and state wildlife areas known or suspected to be on the Site.

Please send all correspondence concerning this matter to:

Donald F. Knorr Senior Ecologist Environmental Resources Management, Inc. 855 Springdale Drive Exton, PA 19341

If you have any questions regarding this matter, you may contact me at 610-524-3677

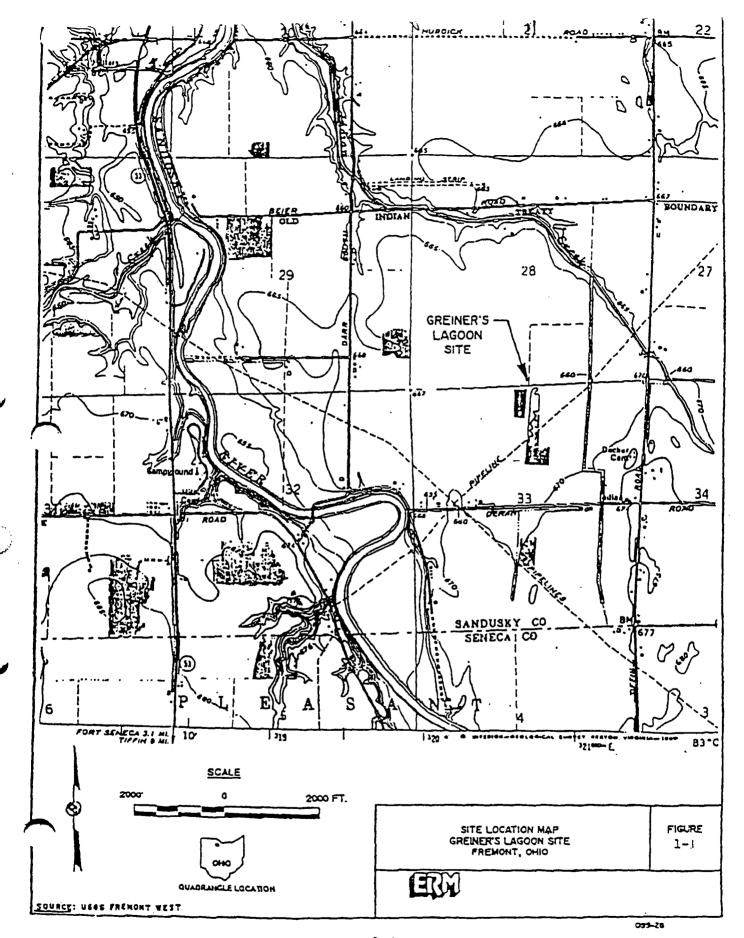
Sincerely,

Donald F. Knorr

Doubl & Know

Senior Ecologist

DFK/ls





United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
6950-H Americana Parkway
Revneldsburg, Ohio 43068

March 14, 1997

Mr. Donald F. Knorr Senior Ecologist Environmental Resources Management, Inc. 855 Springdale Drive Exton, PA 19341

Dear Mr. Knorr:

This responds to your request for endangered species information related to the Lubrizol Greiner's Lagoon Site in Sandusky County, Ohio. These comments have been prepared under the authority of the Endangered Species Act of 1973, as amended, and are consistent with the intent of the National Environmental Policy Act of 1969, and the U.S. Fish and Wildlife Service's Mitigation Policy.

ENDANGERED SPECIES COMMENTS: The Greiner's Lagoon Site in Sandusky County, Ohio lies within the range of the Indiana bat (E), bald Eagle (T), piping plover (E), and prairie fringed orchid (T), federally listed endangered (E) or threatened (T) species. Due to the project type, size, and location, the proposed project will have no effect on these species. This precludes the need for further action on this project under the 1973 Endangered Species Act, as amended. Should the project be modified or new information becomes available that indicates listed or proposed species may be affected, consultation should be initiated with this office.

Two divisions of the Ohio Department of Natural Resources, the Division of Wildlife (DOW, 614-265-6300) and the Division of Natural Areas and Preserves (DNAP, 614-265-6472), maintain lists of plants and animals of concern to the State of Ohio. If you have not already done so, you may wish to contact each of these agencies for site-specific information regarding species of state concern.

If you have questions or we may be of further assistance in this matter please contact Mr. Bill Kurey of this office at 614-469-6923.

Field Supervisor

cc: John Marshall, ODNR, ODOW

Environmental Resources Management, Inc.

855 Springdale Drive Exton, Pennsylvania 19341 (610) 524-3500 (610) 524-7335 (fax)

13 March 1997

Debbie Woischke
Heritage Data Services
Division of Natural Areas and Preserves
Ohio Department of Natural Resources
Fountain Square, Building F
Columbus, Ohio 43224



RE: Protected Species Screening Lubrizol Corporation Fremont, Ohio

Dear Ms. Woischke:

Pending a decision by the United States Environmental Protection Agency (U. S. EPA), Lubrizol Corporation may be required to conduct corrective action under the Comprehensive Environmental Response, Compensation and Liability Act at the Greiner's Lagoon Site. The Site is located in Sandusky County, Ballville Township and can be found on the Fremont West Quadrangle, United States Geological Survey (USGS) topographic map.

The U. S. EPA is requiring Lubrizol Corporation to obtain information regarding protected species and their critical habitats in the proximity of the pending corrective action. Additionally, as a private entity, Lubrizol Corporation has responsibilities under Section 9 of the Endangered Species Act (ESA) not to affect listed species.

Environmental Resources Management, Inc. (ERM) is currently conducting a screening-level evaluation to determine whether there are any ESA issues associated with the pending corrective action on Lubrizol Corporation. Accordingly, the purpose of this letter is to solicit information from the Division, concerning the occurrence of any federal or state listed endangered, threatened, proposed, or candidate species or their critical habitats in the proximity of the area associated with the pending corrective action. Since the Division is the recognized authority concerning protected species and their critical habitats, ERM is leaving open, to the Division's interpretation, the geographic area of concern. To

Ohio Division of Wildlife 09928.00.01 12 March 1997 Page 2

aid in this determination, ERM is enclosing a map of the Site. If there are any occurrences, ERM requests the Division to provide a listing of state and regional protected species, or proposed species or critical habitats and state wildlife areas known or suspected to be on the Site.

Please send all correspondence concerning this matter to:

Donald F. Knorr Senior Ecologist Environmental Resources Management, Inc. 855 Springdale Drive Exton, PA 19341

If you have any questions regarding this matter, you may contact me at 610-524-3677

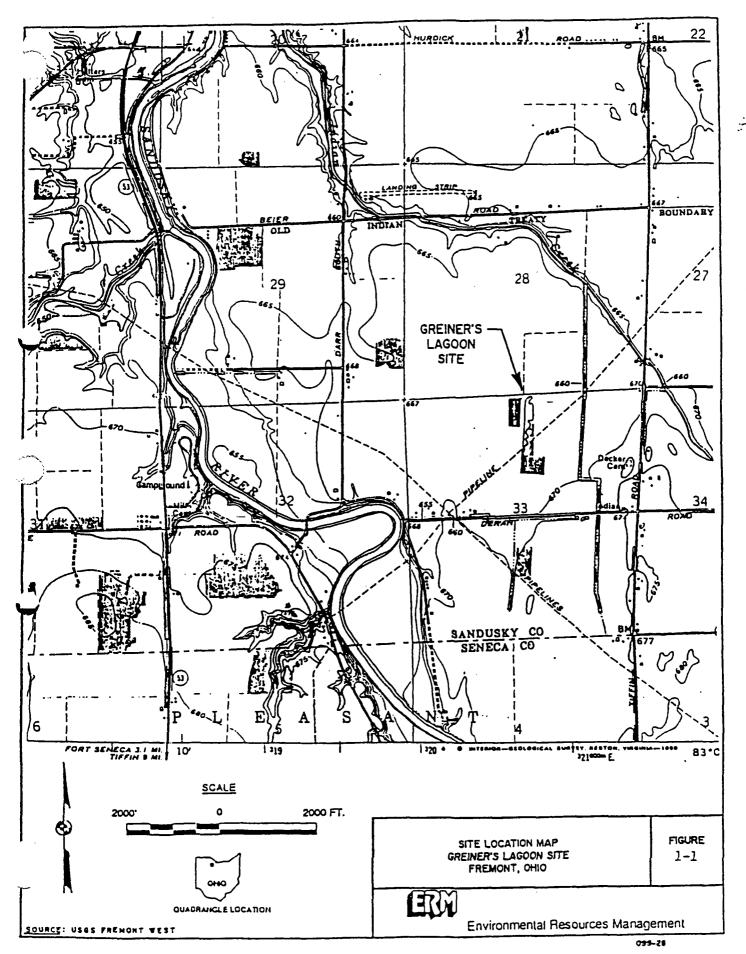
Sincerely,

Donald F. Knorr

Donald of Know

Senior Ecologist

DFK/ls



OHIO NATURAL HERITAGE PROGRAM DIVISION OF NATURAL AREAS AND PRESERVES DATA REQUEST

Please enclose:	 A letter formally requesting information from the Natural Heritage Program. Maps detailing the boundaries of your study area.
	Date 13 March 1997
User Identificat	
Agency/Organizat	ion <u>Environmental Resources Management (ERM)</u>
Name & Title	Lynnette Saunders, Project Scientist
Address	855 Springdale Drive, Exton PA 19341
Phone	(610) 524-3419
Name project or tracting agency,	program requiring this information. If there is a congive name, address and phone number of contact person.
	We are doing an Ecological Risk Assessment for Lubrizol, Corp.
	under USEPA Region V, John O'Grady (312)886-1477
	
	tage Program maintains locational data for the following ecies and features. Check the appropriate boxes to indicate
O State	Animals: © All al Status Only Legal Status Only (non-legal status) Animals: © All D Federal Status Only D State Legal Status Only D Rare non-legal status)
Natural Communit	ies: All Wetlands Only
	Other (please specify)
Other Cresis! Red	· · · · · · · · · · · · · · · · · · ·
Other Special Fea	descriptions: All Geologic Features Breeding/Non-breeding Animal Concentrations Champion Trees State Nature Preserves Natural Areas State Wild, Scenic and Recreational Rivers

(over)

	Besides <u>name</u> , <u>location</u> , and <u>status</u> , specify any additional information you may require.
	(none)
	· · · · · · · · · · · · · · · · · · ·
	Describe the level of locational accuracy necessary for your project.
	on or adjacent to the site (see enclosed map)
	How will the information be used? This information will be used in a report
•	to the USEPA Region V for and Ecological Risk Assessment.
	In what form and detail do you wish to publish this information?
}	no plans to publish the data
	The information supplied above is complete and accurate. Any material supplied by the Natural Heritage Program will not be published without prior written permission and without crediting the Division of Natural Areas and Preserves as the source of the material.
ı	Signature Lynnette Sounders
	Return Completed Form To: Heritage Data Services, Division of Natural Areas Preserves, Ohio Department of Natural Resources, Fountain Square, Building F, Columbus, OH 43224. Phone 614/265-6472 Fax 614/267-3096
	Data Services Fees*

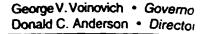
Manual Search: Base fee = \$20 per request plus \$25 per hour

when data is provided.

Computer Search:

Base fee = \$40 per search plus \$.50 per page for printouts exceeding 10 pages.

^{*} The Heritage staff will determine the most cost-efficient method of supplying the data. A cost estimate can be provided. Unless otherwise specified, no prepayment is necessary. An invoice will accompany the data services response.





March 13, 1997

Lynnette Saunders
Environmental Resources Management, Inc. 855 Springdale Drive
Exton. PA 19341

Dear Ms. Saunders:

I have reviewed our Natural Heritage maps and files for the Greiner's Lagoon Site in Sandusky County on the Fremont West Quad. The numbers on the list below correspond to the areas marked in red on the accompanying map. Common name, scientific name and status are given for each species.

FREMONT WEST QUAD

- 1. Moxostoma carinatum River Redhorse (fish), special interest
- 2. Wolf Creek Scenic River Access Sandusky County Park District
- 3. Sandusky State Scenic River

Additional information on the Sandusky River and Scenic Rivers Act is enclosed. If you have any questions about the river, please contact our Northwest Ohio Scenic River Coordinator Russ Gibson at 1435 Township Road 38W, Tiffin, OH, 44883 or 419-981-6319 which is both his phone and fax number.

There are no existing or proposed state nature preserves at the project site. We are also unaware of any state parks, forests or wildlife areas in the project vicinity.

Our inventory program has not completely surveyed Ohio and relies on information supplied by many individuals and organizations. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area. Please note that although we inventory all types of plant communities, we only maintain records on the highest quality areas. Also, we do not have data for all Ohio wetlands. For additional information on wetlands, please contact the Division of Wildlife at 614-265-6300.

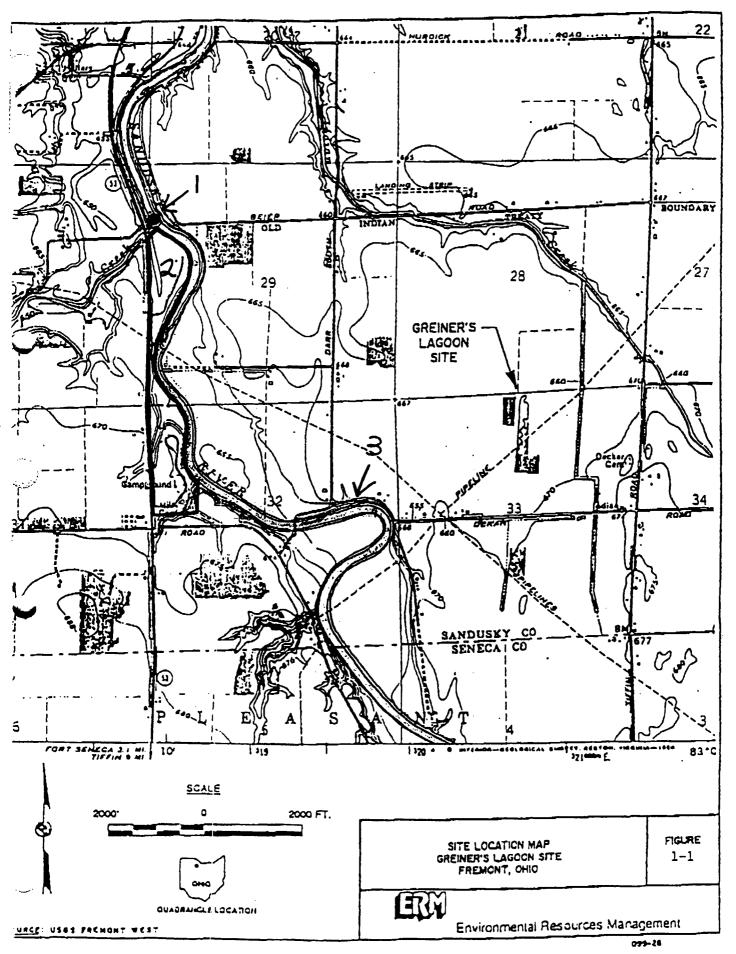
Please contact me at 614-265-6818 if I can be of further assistance.

Sincerely.

Debbie Woischke, Ecological Analyst Division of Natural Areas & Preserves

Dibhie Worschle

cc: Donald F. Knorr /



Environmental Resources Management, Inc.

855 Springdale Drive Exton, Pennsylvania 193. (610) 524-3500 (610) 524-7335 (fax)

17 March 1997

Carolyn Kaldwell Ohio Division of Wildlife 1840 Belcher Drive Columbus, OH 43224



RE: Protected Species Screening Lubrizol Corporation Fremont, Ohio

Dear Ms. Kaldwell:

Pending a decision by the United States Environmental Protection Agency (U. S. EPA), Lubrizol Corporation may be required to conduct corrective action under the Comprehensive Environmental Response, Compensation and Liability Act at the Greiner's Lagoon Site. The Site is located in Sandusky County, Ballville Township and can be found on the Fremont West Quadrangle, United States Geological Survey (USGS) topographic map.

The U. S. EPA is requiring Lubrizol Corporation to obtain information regarding protected species and their critical habitats in the proximity of the pending corrective action. Additionally, as a private entity, Lubrizol Corporation has responsibilities under Section 9 of the Endangered Species Act (ESA) not to affect listed species.

Environmental Resources Management, Inc. (ERM) is currently conducting a screening-level evaluation to determine whether there are any ESA issues associated with the pending corrective action on Lubrizol Corporation. Accordingly, the purpose of this letter is to solicit information from the Division, concerning the occurrence of any federal or state listed endangered, threatened, proposed, or candidate species or their critical habitats in the proximity of the area associated with the pending corrective action. Since the Division is the recognized authority concerning protected species and their critical habitats, ERM is leaving open, to the Division's interpretation, the geographic area of concern. To aid in this determination, ERM is enclosing a map of the Site. If there are

Ohio Division of Wildlife 09928.00.01 12 March 1997 Page 2

any occurrences, ERM requests the Division to provide a listing of state and regional protected species, or proposed species or critical habitats and state wildlife areas known or suspected to be on the Site.

Please send all correspondence concerning this matter to:

Donald F. Knorr Senior Ecologist Environmental Resources Management, Inc. 855 Springdale Drive Exton, PA 19341

If you have any questions regarding this matter, you may contact me at 610-524-3677

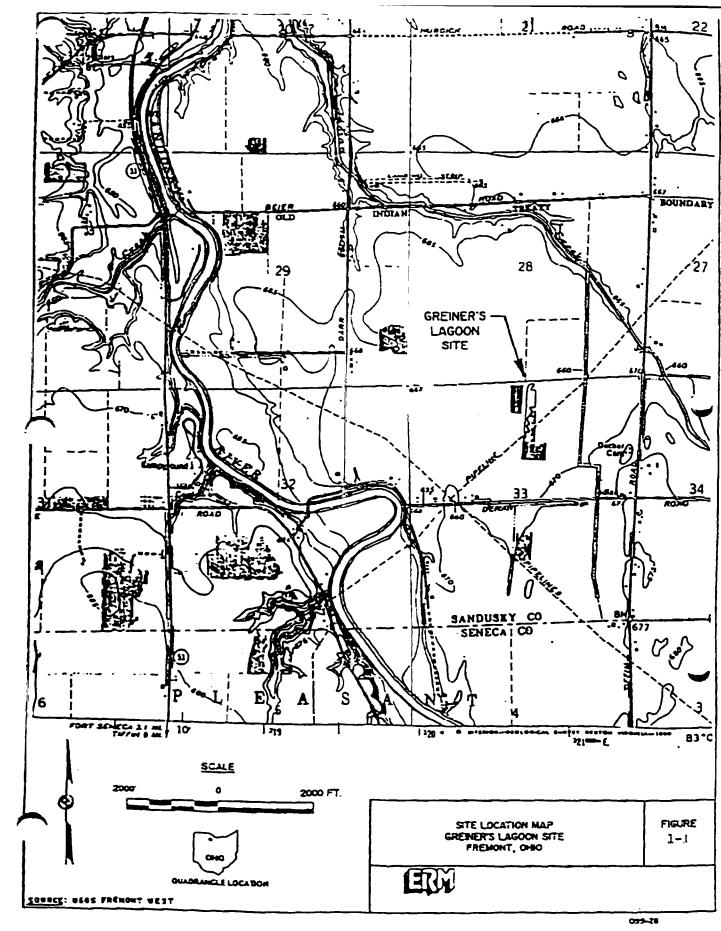
Sincerely,

Donald F. Knorr

Donald of Zuver

Senior Ecologist

DFK/ls





Division of Wildlife

George V. Voinovich • Governor Donald C. Anderson • Director

1840 Belcher Drive, Columbus, Ohio 43224-1329 • 614-265-6300 • Michael J. Budzik, Chief

March 20, 1997

Donald F. Knorr, Senior Ecologist Environmental Resources Management, Inc. 855 Springdale Drive Exton, Pennsylvania 19341

Dear Mr. Knorr:

Carolyn Caldwell and I have reviewed your letter concerning protected species in the vicinity of the Lubrizol Corporation in Fremont, Ohio. The only species we are aware of is a Ohio endangered fish, the greater redhorse (Moxostoma valenciennesi), in the Sandusky River. As you can see on the attached pages this species has been collected in the Sandusky River both upstream and downstream from the project area (approximately River Mile (RM) 24.8). The largest numbers of the sucker have been collected over five miles upstream, however.

Sincerely,

Randy E. Sanders
Assistant Administrator

Rudin

Fish Management and Research

RES:kl

Attachment

cc: John Marshall

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Greater Regnorse Code: 40-012 Feed Guild: S

Page 1

River Code	River Name	River Mile	Date	Data Source	Dist Fish	# of Fish	Avg Rel Number	Max Rel Number	Relative Weight	Ave(gn Weigh
04-100	Auglaize River	61.80	07/29/91	01	0 47	20	42 55		8.54	203.0
05-001	Sandusky River	38.70	08/29/90	01	0.10	3	30.00		3.67	122.3:
04-100	Auglaize River	63.10	C7/29/91	01	0.51	13	25.49		1.37	53.88
04-200	Ottawa River	1.20	07/16/96	01	0.50	9	18.00		19.19	1,066.3;
05-001	Sandusky River	47.60	07 <i>/</i> 30 <i>/</i> 90	01	0 50	9	18.00		3.28	182.0(
05-001	Sandusky River	38 90	08/01/90	01	0.40	7	17.50		2.34	133.57
05-001	Sandusky River	38.90	10/09/90	01	0.40	6	15.00		2.39	159.5(
05-001	Sandusky River	36.30	08/29/90	01	0.40	5	12.50		15.31	1,224.40
05-001	Sandusky River	41.60	07/31/90	01	0.50	6	12.00		8.06	672.00
05-001	Sandusky River	41.60	08/29/90	01	0.50	6	12.00		1.57	130.83
04-100	Auglaize River	61.80	09/11/91	01	0.47	5	10.64		0.07	6.20
04-200	Ottawa River	3.80	08/13/96	01	0 50	5	10.00		8.12	811.80
05-001	Sandusky River	47.60	08/28/90	01	0 50	5	10.00		0.57	56.80
05-001	Sandusky River	38.70	10/09/90	01	0.10	1	10.00		8.60	860.00
05-001	Sandusky River	32.00	10/09/90	01	0.50	5	10.00		7.54	754.20
05-001	Sandusky River	31.00	09/19/88	01	0 51	5	9.80		16.28	1,660.00
04-100	Auglaize River	58.40	09/12/91	01	0.50	4	8.00		0.09	10.75
04-100	Auglaize River	58.00	09/12/91	01	0.50	4	8.00		0.08	<u></u>
04-100	Auglaize River	63.10	09/11/91	01	0.51	4	7.84		1.15	147.00
05-001	Sandusky River	31.00	07/08/88	01	0.51	4	7.84		10.98	1,400.00
05-001	Sandusky River	36.30	07/10/90	01	0.40	3	7.50		0.76	101.67
05-001	Sandusky River	66.70	10/04/90	01	0.48	3	6.25		3 56	570.00
04-100	Auglaize River	67.00	07/29/85	01	0.50	3	6.00		1.25	208.00
04-100	Auglaize River	65.00	08/28/86	01	0.50	3	6.00		3.69	615.00
04-100	Auglaize River	65.00	07/30/91	01	0.50	3	6.00		7.37	1,229.00
05-001	Sandusky River	47.60	10/04/90	01	0.50	3	6.00		0.36	60.00
05-001	Sandusky River _	41.60	10/04/90	01	0.50	3	6.00		4.52	752.67
05-001	Sandusky River	27.10	07/08/88	01	0.50	3	6.00		9.10	1,516.67
05-001	Sandusky River	27.10	09/19/88	01	0.50	3	6.00		9.10	1,516.67
04-200	Ottawa River	37.70	08/28/89	01	0.20	1	5.00		0.30	59.00
05-001	Sandusky River	39.40	08/05/81	01	0.43	2	4.65		2.54	546.00
05-001	Sandusky River	39 40	09/16/81	01	0.43	2	4.65		1.26	270 00
05-001	Sandusky River	38.50	08/29/90	01	0.24	1	4.17		0.67	10
05-001	Sandusky River	38.50	10.739/90	01	0.24	1	4.17		0.73	174.00
04-001	Maumee River	54.70	07/23/96	01	0.50	2	4.00		0.78	194.00
04-100	Auglaize River	65 00	09/17/86	01	0.50	2	4 00		4.80	1,200.00
04-100	Auglaize River	52.70	09/18/91	01	0.50	2	4.00		0 06	16.00
04-100	Auglaize River	39.70	07/30/91	01	0.50	2	4 00		1.65	411.50
04-200	Ottawa River	5 60	07/17/96	01	0.50	2	4.00		5.92	1,480.00
05-001	Sandusky River	32.00	08/29/90	01	0 50	2	4.00		0.26	64.00
04-100	Augiaize River	85.10	07/02/91	01	0.20	2	3.00		0.55	184.50
05-001	Sandusky River	38 90	08/29/90	01	0.40	1	2.50		0.33	130.00
05-001	Sandusky River	38.10	08/05/81	01	0.40	1	2.50		1.85	741.00
04-001	Maumee River	129.00	10/17/96	01	0.50	1	2.00		3.45	1,725.00
04-001	Maumee River	49 60	07/22/96	01	0 50	1	2.00		0.45	225.00
04-026	Bad Creek	12.80	C8/25/89	01	0 15	1	2 00		0.15	75.00
	Auglaize River	65 00	10/21/86	01	0.50	1	2.00		0.64	319.00
	Auglaize River	65 00	09/11/91	01	0.50	1	2.00		2.00	1,000.00
04-100	Auglaize River	63 30	08/28/86	01	0.50	1	2 00		2.40	1,200.00
		00 00	00,20,00	J.	5.50	•	2 00		,0	,

Decline Spc: D Tolerance: R Code: 40-012 Breed Guild: S

River Code	River Name	River Mile	Date	Data Source	Dist Fish	# of Fish	Avg Rel Number	Max Rel Number	Relative Weight	Ave(gr Weigh
04-100	Auglaize River	39.70	06/25/91	01	0.50	1	2.00		0.72	361.00
04-100	Auglaize River	39.70	09/10/91	01	0.50	1	2.00		0.01	6.00
04-200	Ottawa River	5.60	08/14/96	01	0.50	1	2.00		3.90	1,950.00
04-200	Ottawa River	3.80	07/16/96	01	0.50	1	2.00		1.38	692.0 (
04-400	St. Joseph River	51.90	09/16/92	01	0.50	1	2.00		0.83	414.0(
04-400	St. Joseph River	50.80	08/19/92	01	0.50	1	2.00		0.59	296.00
04-400	St. Joseph River	49.80	08/19/92	01	0.50	1	2.00		0.66	330,00
04-400	St. Joseph River	47.20	08/18/92	01	0.50	1	2.00		0.62	310.00
04-400	St. Joseph River	47.20	09/15/92	01	0.50	1	2.00		1.01	503.00
05-001	Sandusky River	56.70	10/04/90	01	0.50	1	2.00		0.29	146.00
05-001	Sandusky River	26.60	08/04/81	01	0.50	1	2.00		1.60	800.00
05-001	Sandusky River	14.20	07/06/88	01	0.50	1	2.00		1.44	720.00
05-001	Sandusky River	14.20	08/16/88	01	0.50	1	2.00		1.08	540.00
04-001	Maumee River	54.90	07/06/92	01	0.62	1	1.61		0.71	442.00
04-100	Auglaize River	39.70	09/09/96	01	0.21	1	1.43		0.72	506 .00

Appendix M Phytoremediation Feasibility Study

The Lubrizol Corporation

Phytoremediation Feasibility Study Greiner's Lagoon Site Fremont, Ohio

May 2001

Environmental Resources Management 17187 N. Laurel Park Drive, Suite 235 Livonia, Michigan 48152

TABLE OF CONTENTS

1.0	Intro	duction	1			
	1.1	Background	1			
2.0	Phytoremediation Technology					
	2.1	Promotion of Plant Stabilization, Degradation, Translocation, or Volatilization	3			
	2.2	Prevention of Soil Erosion	4			
	2.3	Evapotranspiration and Hydraulic Control	4			
	2.4	Sustained Long-Term Eco. Considerations	5			
3.0	Site Assessment					
	3.1	Characterization	6			
	3.2	Streamlined Risk Evaluation	7			
	3.3	Screening and Preliminary Ecological Risk Assessment	9			
	3.4	Plant Growth Conditions	11			
	3.5	Native Vegetation	12			
	3.6	Evapotranspiration/Remediation by Tall Grasses	12			
	3.7	Hydraulic Barrier/Remediation by Trees	18			
	3.8	Conclusions	18			
4.0	Conc	ceptual Implementation of Phytoremediation	21			
	4.1	Vegetative Cover	21			
	4.2	Perimeter Tree Barrier	22			
5.0	Conclusions					
6.0	References					

ERM

LIST OF FIGURES

- 3-1 SITE MAP
- 3-2 ALLOMETRY CORRELATION CURVE
- 4-1 PHYTOREMEDIATION IMPLEMENTATION

LIST OF TABLES

- 3-1 CONSTITUENTS OF POTENTIAL ECOLOGICAL CONCERN
- 3-2 SOIL FERTILITY SAMPLES
- 3-3 LIST OF OBSERVED VEGETATION AT SITE
- 3-4 ESTIMATED TRANSPIRATION RATE OF TALL GRASSES
- 3-5 ESTIMATED TRANSPIRATION RATE OF TREES
- 3-6 PHYTOREMEDIATION WATER BALANCE CALCULATIONS
- 3-7 THORNTHWAITE METHOD CALCULATIONS
- 4-1 ESTIMATED COST
- 4-2 CASE STUDIES: PHYTOREMEDIATION OF PETROLEUM HYDROCARBONS
- 4-3 CASE STUDIES: PHYTOREMEDIATION APPLICATION IN COLD-WEATHER CLIMATES

LIST OF APPENDICES

- A HELP MODEL RESULTS
- B PHYTOREMEDIATION PROJECTS-SWITCHGRASS
- C PHYTOREMEDIATION PROJECTS-OHIO EPA

1.0 INTRODUCTION

On July 30, 1991, The Lubrizol Corporation (Lubrizol) entered into an Administrative Order by Consent (AOC) with U.S. EPA Region V pursuant to Section 106 of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) to undertake actions to produce an Engineering Evaluation/Cost Analysis (EE/CA) for the Greiner's Lagoon Site in Sandusky County, Ohio. The EE/CA report (revised September 2000) identified and evaluated several alternatives for a non-time critical removal action at the Site. One of these alternatives was the use of a technology known as phytoremediation. Phytoremediation is the use of plants to promote remediation of soil and/or ground water, to prevent soil erosion, and to control infiltration into and from subsurface strata.

The EE/CA evaluated several remedial alternatives for the Greiner's Lagoon Site, including phytoremediation. Pursuant to comments received from U.S. EPA and Ohio EPA, Lubrizol agreed to provide supplemental information concerning the phytoremediation alternative. Therefore this Phytoremediation Feasibility Study has been prepared to further evaluate whether the phytoremediation technology can be applied at the Greiner's Lagoon Site.

1.1 BACKGROUND

The Greiner's Lagoon Site is located south of Fremont, Ohio on County Road 181 about 1/2 mile west of Tiffin Road in Ballville Township, Sandusky County. The Site was originally developed by Mr. Terry Little in 1954 and consisted of four lagoons to store waste oil from nearby industry. After several changes in ownership, the Site was purchased by Mr. Gary Greiner in 1973. During the course of Site operations by the various owners, a number of community complaints and legal actions were undertaken because of odors and releases from the lagoons. In 1980, a judgment handed down by the Sandusky Court of Common Pleas ordered Mr. Greiner to clean up the Site. He did not comply with the order.

In 1981, 1982 and 1986-1988, U.S. EPA implemented site removal actions including lagoon dike reinforcement, surface oil removal, liquids treatment and discharge, sludge solidification, lagoon backfilling, and placement of a soil cover over the filled lagoons. Between 1982 and 1985, Ohio EPA coordinated the delivery of sand and gravel washings from the processing of sugar beets and placement of the material in the lagoons.

As further described in the EE/CA, Lubrizol entered into the AOC with U.S. EPA Region V in July 1991, under which an EE/CA was developed. During August 1991, Lubrizol arranged for the removal of the access road adjacent to the Site, improvement of surface water drainage, and installation of a fence to improve Site security. In 1997 and 1998, Lubrizol repaired areas of visible seepage at the Site using compacted clay, topsoil and seeding, and riprap.

Based on the results of the EE/CA site investigations and risk assessments, the objective for the non-time critical removal action at the Site is as follows:

The removal action will provide for short- and long-term minimization of the potential for human and biota exposure to constituents of concern at levels which would result in calculated risks above U.S. EPA thresholds for the site. The removal action will be implemented to the extent practicable in accordance with applicable, or relevant and appropriate requirements (ARARs).

In the EE/CA, candidate removal action technologies were screened based on effectiveness, implementability, and cost. Phytoremediation technology was selected as a one of the preferred alternatives. Direct uptake of contaminants by certain plants and subsequent volatization is in known as phytovolatization.

Not all plant species have these properties, and therefore, plants for potential use at the Greiner's Lagoon Site must be screened for these properties.

2.2 PREVENTION OF SOIL EROSION

Vegetative cover, both living and dead, is instrumental in preventing soil erosion. Initially this is brought about by reducing the physical force of raindrops that loosen soil particles when they strike bare soil, and allow particles to be carried off as suspended matter in runoff.

Another important feature of plants is that beneath the dead plant litter, the interwoven network of roots holds the soil in place to help prevent erosion.

The plant features that prevent soil erosion are common to all plants and therefore almost any plant species is satisfactory for this purpose provided it grows fast and forms a dense cover over the soil.

2.3 EVAPOTRANSPIRATION AND HYDRAULIC CONTROL

Plants influence the local hydrology by recycling rainwater from the soil to the atmosphere through the process of evapotranspiration. This process is the result of two events – both of which are dependent on the magnitude of the leaf surface area. Plant leaves intercept falling rain and a portion of it remains suspended on the leaf surfaces until it evaporates back into the atmosphere. As a result, light rain falling on dense vegetation never reaches the soil surface. During periods of heavy rain when the leaf surfaces become saturated, the excess water drips to the ground and soaks into the porous surface soil where it is subject to uptake by plant roots and subsequent return to the atmosphere through plant transpiration. During plant transpiration, large amounts of water are absorbed by roots and are transported up the stem to the leaves where the water evaporates back into the atmosphere. The amount of water lost from an individual plant or stand of vegetation is directly dependent on the magnitude of leaf surface area, measured as biomass of green tissues.

Two other factors that influence the amount of transpiration are the length of the growing season and the distribution of the root system. The longer the plant retains its leaves and the deeper its roots, the larger the amount

of evapotranspiration that occurs. This effectively reduces the amount of rain infiltration that might occur through contaminated soil and limits ground water recharge.

The uptake and transpiration of ground water from the subsurface can be used to provide hydraulic control. Hydraulic control, or phytohydraulics, is the use of plants and trees to take up ground water in order to contain or limit migration of subsurface water. This can effectively control the amount of ground water flow migrating into and/or from a site.

Not all plant species have these large evapotranspiration properties, and therefore, plants for potential use at the Greiner's Lagoon Site must be screened for these properties.

2.4 SUSTAINED, LONG-TERM, ECOLOGICAL CONSIDERATIONS

For phytoremediation to be successful, it is imperative that the site be planted with perennial vegetation that is adapted to the environmental conditions prevailing at the site. Additionally, the plants must be robust and aggressive such that they will not be immediately be replaced by a more competitive wild species prone to invade the site. Through phytoremediation technology, both the soil and its associated flora and fauna, will in time return to a natural state that blends with the surrounding habitat.

Not all plant species have these properties, and therefore, plants for potential use at the Greiner's Lagoon Site must be screened for these properties.

1.7

3.0 SITE ASSESSMENT

Successful implementation of phytoremediation technology is dependent on careful selection of plant species that are adaptive to site conditions and satisfy the objectives of the site.

3.1 CHARACTERIZATION

Soil and Stabilized Material

Site investigations conducted under the EE/CA indicated that approximately 35 feet of soil (primarily of glacial and alluvial deposits) overlies the limestone bedrock at the Site. Generally, the upper 8 to 10 feet of naturally occurring soil (outside the Consolidation Area) is either silty sand, sand, or silty clay. The soil deeper than 8 to 10 feet is primarily clay or silty clay. The Site data indicate that the clay/silty clay, which is approximately 25 feet thick, acts a confining layer for the regional bedrock aquifer.

Within the Consolidation Area, the average stabilized material thickness is approximately 17 feet at the north side of the site (maximum of 20 feet). The stabilized material is made up of silty clay with some sand. Some oil staining and debris are present in the material. Sampling of the stabilized material at the north side of the site indicate there are areas of soft to medium consistency.

Sampling and analysis of the stabilized material indicated that the primary impacts would be from benzene, toluene, ethylbenzene, xylene, acetone, 4-methyl-2-pentanone, phenol, and bis(2-ethylhexyl) phthalate at depths of less than 10 feet in the Consolidation Area, with concentrations generally decreasing at depths greater than 10 feet.

Ground Water

Monitoring of the bedrock aquifer at the Site showed that the localized bedrock ground water flow direction is generally to the east-northeast. Monitoring also indicated that there is a shallow saturated zone on top of the clay/silty clay which is generally encountered at a depth of 4 to 15 feet below the ground surface. This shallow zone generally radiates away from the drainage ditch on the northeast end of the Site. The shallow monitoring wells indicate that the localized flow direction of the shallow saturated zone is generally toward the northwest, west and southwest with an average hydraulic gradient of 0.01 ft/ft, an average hydraulic conductivity of 2.51 ft/day and an average ground water velocity of 0.084 ft/day (assuming a porosity of 0.3).

The shallow ground water is not used as a water supply source in the area. This shallow ground water will not be used for potable purposes due to its low yield, the location of the higher yielding bedrock aquifer at a depth of approximately 35 feet, and restrictions imposed by the Ohio Department of Health requiring that water well depths must be > 25 feet below ground surface. Based on the presence of the 25 foot clay unit, geotechnical testing of the clay unit, differences in water level data and the differences in hydraulic gradient between the two units, the shallow saturated zone and bedrock aquifer are not connected.

As indicated in the EE/CA, the principal constituents detected in the onsite shallow saturated zone were acetone, benzene, 4-methyl-2-pentanone, phenol, arsenic, chromium, and lead. Samples for arsenic, chromium, and lead analyses were not filtered.

Surface Water and Sediment

The surface water at the site flows to drainage channels on the east and west sides. Surface water eventually flows via underground pipe to a county drainage channel. Sampling and analysis of the surface water and sediment in the drainage ditch east of the Site showed no significant impacts to these environmental media.

Phytoremediation Technology Selection Impacts

- Sampling of the stabilized material in the Consolidation Area indicates there are some oil staining and debris, there are some areas of soft to medium consistency, and primary impacts appear less than 10 feet below ground surface;
- The maximum stabilized material thickness is 20 feet at the Consolidation Area;
- The shallow saturated zone generally is encountered at a depth of between 4 and 15 feet below grade; and
- The bedrock aquifer is approximately 35 feet below grade.

3.2 STREAMLINED RISK EVALUATION

A streamlined risk evaluation (SRE) of the Site was conducted under the EE/CA and identified three human receptor groups as having potential current or future exposures at the Site. These human receptor groups

consist of future construction workers, local residents who may contact affected off-site soil and who may use the bedrock ground water as a drinking water source and occasional trespassers.

The estimated carcinogenic and noncarcinogenic risks for the future construction worker who may be exposed to off-site soils and the off-site shallow saturated zone were below the acceptable benchmarks established by U.S. EPA. However, potential construction worker exposures to onsite soils and the on-site shallow saturated zone resulted in risk marginally above the benchmarks, but well within USEPA's acceptable cancer risk range of 1×10^4 to 1×10^6 . The carcinogenic risk for exposure to on-site soil was estimated at 4×10^6 , which is only slightly above USEPA's cancer risk benchmark of 1×10^6 . The noncarcinogenic risk was estimated at hazard index of 5. These exceedances were due to Aroclor 1254 and bis(2-Ethylhexyl)phthalate in the soil.

As previously noted, the potential risks for construction worker exposures were driven by the high soil EPC for Aroclor 1254. The soil data set for Aroclor 1254 was highly matrix dependent and accordingly included several samples with elevated quantitative estimates of the compound based on high laboratory detection limits resulting from sample matrix interferences during analyses.

The carcinogenic risk for exposures to the on-site shallow saturated zone was estimated at USEPA's benchmark of 1 x 10⁻⁶. The noncarcinogenic risk was estimated at hazard index of 1.8, which is slightly above the acceptable hazard index of 1.0. This exceedance was due to benzene, 4-methylphenol, toluene, and ethylbenzene in the shallow saturated zone. Benzene is in excess of MCLs in the on-site shallow saturated zone. The above identified small potential risks for future on-site construction workers can be virtually eliminated by employing routine health and safety measures for any on-site construction.

There were no significant estimated risks for the construction worker from potential exposure to the surface water and sediment in the drainage ditch.

The SRE found that the estimated risks for local residents who may have contact with off-site soil and who could use bedrock ground water as a drinking water supply were below the benchmarks established by U.S. EPA.

The estimated carcinogenic risk calculated for the occasional trespasser potentially exposed to on-site soil was 3×10^6 which is marginally above the benchmark of 1×10^6 , but well within the acceptable range of 1×10^4

to 1 x 10⁻⁶. This exceedance was due to Aroclor 1254 and bis(2-Ethylhexyl)phthalate in the soil. The noncarcinogenic risks estimated for the trespasser were also well below the acceptable hazard index of 1.0. There were no significant estimated risks to the hypothetical trespasser from potential exposure to the surface water and sediment in the drainage ditch east of the Site.

As previously noted, the potential risks for construction worker exposures were driven by the high soil EPC for Aroclor 1254. The soil data set for Aroclor 1254 was highly matrix dependent and accordingly included several samples with elevated quantitative estimates of the compound based on high laboratory detection limits resulting from sample matrix interferences during analyses.

Phytoremediation Technology Selection Impacts

- On-site soils pose a carcinogenic and noncarcinogenic risk slightly above benchmarks from Aroclor 1254 and bis(2-Ethylhexyl)phthalate;
- The on-site shallow saturated zone poses a noncarcinogenic risk slightly above benchmarks from benzene, 4-methylphenol, toluene, and ethylbenzene;
- Risks from exposure to bedrock ground water, the off-site shallow saturated zone, off-site soil, surface water and sediment are below the benchmarks established by U.S. EPA;
- Impacted on-site soils cover an area of 3.2 acres (see Figure 3-1).

3.3 SCREENING AND PRELIMINARY ECOLOGICAL RISK ASSESSMENT

A screening and preliminary ecological risk assessment, including an ecological reconnaissance, was performed under the EE/CA for the Site. The ecological risk assessment found that the habitats and associated wildlife at the Site are typical of the predominantly agricultural land use of northwest Ohio. Potential ecological receptors could be at risk due to erosion and storm water runoff during times of high or prolonged rainfall. Constituents of potential ecological concern in on-site soil are identified in Table 3-1.

It is important to note, however, that as part of a removal action in 1987, the USEPA installed a clean soil cover over the Consolidation Area. Thus, no affected material should be available for exposure, except for limited areas where this cover may have been breached. In addition the

assessment found that exposure of ecological receptors in these areas would be limited due to the limited size of the impacted area and the lack of wildlife attractant value (food or cover resources).

Neither the drainage ditch east of the Site nor Indian Creek, into which the ditch discharges, contain suitable habitat for aquatic communities because of modifications to enhance drainage for agricultural purposes. The waterways have no vegetative cover and have been channelized and deepened with steep banks. The adjacent fields have been farmed up to the edges of the waterways. In addition, samples of the surface water and sediment from the nearby drainage channel indicate little impact from the Site.

Contacts with government agencies and the Site reconnaissance did not identify any federal threatened or endangered species at the Site that could be impacted by potential removal actions. No plant and animal species of special interest in Sandusky County have been observed in the vicinity of the Site.

A formal wetland delineation was not conducted as part of the Site reconnaissance. However, the total potential wetland area on the west side of the Site receiving surface water runoff from the Consolidation Area is estimated to be less than one acre. The drainage ditch on the east side of the Consolidation Area which also receives surface water runoff is not likely to be classified as a jurisdictional wetland by the Army Corps of Engineers. Thus, these areas would not be subject to regulation under the Army Corps of Engineers or the Ohio EPA Division of Surface Water Quality (Personal Communication, Ohio EPA Division of Surface Water Quality, 1999).

Phytoremediation Technology Selection Impacts

- On-site soils pose an ecological risk for the constituents in Table 3-1;
- Off-site soils, surface water, and sediment do not pose an ecological risk;
- The ecological risk assessment performed in the EE/CA was based on the site in its current state.

3.4 PLANT GROWTH CONDITIONS

The success of phytoremediation technology at the site depends on careful selection of plant species that are adapted for sustained growth under the prevailing climatic, topographic and soil conditions.

Climate

The site is cold and snowy in the winter and warm in the summer. Precipitation is well distributed throughout the year with a total annual precipitation of approximately 34 inches. Sixty percent of this falls during April through September. The growing season for the site is from mid-April to the end of October. The average relative humidity is about 72%. The average seasonal snowfall is 17.4 inches. The average windspeed is 9.5 miles per hour.

Topography

The topographic condition at the site is conducive to sustained plant growth. The terrain is graded at a 1- percent slope draining to the storm water ditches to the east and west. The perimeter of the soft areas is sloped at 3:1. The grading reduces the potential for ponded water on the site. Excessive ponding on the site could threaten vegetation established for phytoremediation.

Soil Conditions

The soil condition of the site on the north side is poor as demonstrated by sparse vegetative growth. Soil fertility samples in the soft spots at the north side of the site are presented in Table 3-2. These results indicate the worst case conditions a plant would encounter at the site. Soil pH is high and will hinder growth. All nutrients are within the acceptable range for growth and reproduction. Aluminum at the site is at phytotoxic levels. However, aluminum would only be toxic to a plant at a pH less that 5.5 and is not considered a concern. Based on a review of the soil constituent concentrations in the EE/CA, the level of organic and inorganic constituents are below concentrations known to be toxic for vegetation. The stabilized material on the north side of the site was mixed with sand and gravel washings from the processing of sugar beets. This type of soil does not retain water very effectively and has a low organic content. This also attributes to the poor vegetative growth.

Phytoremediation Technology Selection Impacts

- The growing season for the site is from mid-April to the end of October;
- Precipitation averages approximately 34 inches per year;
- The topography of the site will be conducive to plant growth; and
- Soil conditions at the north side of the site are poor high pH in soft spots and poor soil quality.

3.5 NATIVE VEGETATION

The success of phytoremediation at the site requires the use of plants that are ecologically adapted for long-term growth in northern Ohio. The following two methods were used to evaluate the appropriate plant species suitable for long-term sustained growth at the site:

- Consulting published literature pertaining to the natural distribution of plant species in the region; and
- Conducting a field inventory of the plants growing in and adjacent to the site.

The published literature indicates that the predominant forms of vegetation native to Ohio are species associated with the tall grass prairie.

A field inventory of the plants growing in and adjacent to the site was conducted as part of the EE/CA. The results of the field inventory are presented in Table 3-3.

Phytoremediation Technology Selection Impacts

- Tall grasses are native to Ohio and will grow at the site; and
- Vegetation listed in Table 3-3 will grow at the site.

3.6 EVAPOTRANSPIRATION/REMEDIATION BY TALL GRASSES

An important aspect in evaluating the effectiveness of phytoremediation at the site was to determine if the plants could minimize or eliminate percolation through enhanced evapotranspiration. Plants have the ability

to recycle rainwater from the soil to the atmosphere through the process of evapotranspiration (see Section 2.3).

It is important to understand the concept of root zone storage capacity when trying to understand enhanced evapotranspiration. This is the amount of water that can be held in the root zone before surface water begins to percolate to the underlying soils. The root zone is like a sponge and once it becomes saturated, percolation will occur. In the summer, evapotranspiration is high because the plants are growing and the roots absorb water that infiltrates into the root zone. In late summer, rainfall is less frequent and the root zone becomes dry as the plants continue to absorb water. In the fall as the plants become dormant, evapotranspiration becomes very small but any infiltration gets absorbed into the root zone. Since the root zone is very dry, it absorbs the water, and percolation into the underlying soils does not occur.

In a phytoremediation cover system, the depth of the roots needs to be at a sufficient depth such that percolation will not occur below the root zone.

Three water balance analyses were performed to compare the annual rainfall at the site with the annual rate of evapotranspiration and surface runoff.

HELP Model

The hydrologic performance of the site was determined using the U.S. Environmental Protection Agency's Hydrologic Evaluation of Landfill Performance (HELP) model, Version 3 (EPA/600/R-94/168a, September 1994).

A review of the HELP model documentation indicates that the model is designed for use primarily with standard landfill designs. For modified designs, the HELP model's assumptions might not accurately estimate the hydrologic performance (EPA/600/R-94/168a, September 1994). The primary limitation of the HELP model in accurately estimating the hydrologic performance of the site is that the default vegetation is modeled as shallow-rooted grasses, which are preferred in standard landfill designs. However, deep-rooted vegetation is more appropriate for phytoremediation technologies

Since the transpiration component of the HELP model would be expected to underpredict the rate of actual evapotranspiration provided at the site, the following approach was used to determine the hydrologic balance:

- The annual rate of precipitation at the site was determined based on twenty years of data compiled by the Agricultural Research Service from 1951-1970.
- The annual rate of surface runoff was determined by the HELP model for an excellent stand of vegetation.
- The annual rate of evaporation was based on a six foot evaporative zone depth.

For the purpose of evaluating the hydrologic performance of the site, the following input parameters were selected for use in the HELP model:

- The modeled period was 50 years.
- Evapotranspiration, precipitation, temperature, and solar radiation data were based on historical weather data for Toledo, Ohio. An adjustment in latitude to 41.36 degrees was made for Fremont, Ohio.
- The evaporative zone depth was assumed to be 72 inches based a six foot deep root depth of phytoremediation plants.
- The initial water content of the soil layers was assumed to be in equilibrium.
- The average stabilized material thickness was assumed to be 17 feet, described by the HELP model as soil texture number 11, a silty clay of low-to-medium plasticity. One foot of topsoil was assumed to be placed on top of the material as cover.
- The fraction of area allowing runoff was assumed to be 100% due to a sloped grade across the site.
- The Soil Conservation Service (SCS) runoff curve number was used by the model to calculate surface water runoff.
- The Leaf Area Index (LAI) number was used for the purpose of hydrologic evaluation. A LAI of 4.0 was used in the model, representing an excellent stand of grass.

Using the hydrologic balance criteria discussed above, a conservative estimate of the rate of transpiration required to prevent the accumulation of storm water and hence percolation is as follows:

- 32 inches of precipitation occurs annually;
- A conservative estimate of surface runoff is 2 inches per year based on the HELP model results; and
- Annual evapotranspiration of 28 inches per year based on the HELP model results.

This results in a balance of 2 inches of water per year available for ground water recharge. The results of the HELP model are included in Appendix A.

Annual Water Balance

The objective of this evaluation was to determine the required root zone depth and root zone storage capacity in order to minimize or eliminate deep aquifer infiltration. This approach provides an account of all water entering and leaving the site, which includes: precipitation, runoff, evapotranspiration, infiltration and root zone soil storage capacity. Table 3-6 provides a summary of these values. Explanations of the items in the table, calculations utilized, and assumptions made are further discussed below.

- Monthly average precipitation and temperature data were obtained from the Weather Channel's Internet site: www.weather.com. The values listed in Table 3-6 were obtained for the city of Fremont, Ohio and are monthly averages that have been calculated over the time period from the early 1950s up through the year 2000.
- Stormwater runoff was calculated using the SCS Curve Number Method. An SCS curve number (CN) of 79 (Handbook of Environmental Engineering, 1990) was used in the calculations assuming a land use description of pasture or range land, poor condition and Soil Group B (moderate infiltration rate, well drained soils). Additionally, a type II moisture condition (average conditions) was assumed. These values produced a potential maximum retention (S) for this soil type of 2.66 inches. Runoff was then calculated using the standard SCS rainfall function, which is, direct runoff (Q) = (precipitation 0.2 S)² / (precipitation + 0.8 S).

- Infiltration was calculated as the level of precipitation minus the amount of runoff.
- Potential evapotranspiration (PET) is the theoretical amount of water that would be lost to the atmosphere through both surface evaporation and plant transpiration. In its application, PET represents the maximum water loss provided that sufficient water is available. PET was calculated using the Thornthwaite method. This method utilizes equations and mean monthly temperature values to determine PET.
 See Table 3-7 for summary calculations.
- Actual evapotranspiration (ET) was calculated on a monthly basis using the previous month's actual root zone storage plus the current month's infiltration, however, ET can not exceed the PET.
- Root Zone Storage capacity (RZSC) is defined as the difference between the soil moisture content at field capacity and wilting point. RZSC was calculated from typical moisture values for a silt loam type soil. A field capacity of 24% and wilting point of 15% were used (values obtained from McGraw Hill Series in Water Resources and Environmental Engineering). The field capacity of a soil is defined as the moisture content of the soil after free drainage has removed most of the gravity water (i.e. the presumed water content of a soil at which internal drainage ceases). The wilting point of a soil is defined as the soil wetness below which soil-water extraction by a plant is insufficient to balance the transpiration rate demanded of it by the atmosphere (i.e. the plant can no longer extract sufficient water from the soil for growth). These values produce an available water percent of 9% for this soil type. Using a specific weight of 80 pounds per cubic foot (pcf) for this type of soil and the unit weight of water equal to 62.4 pcf, yields a root zone storage capacity equation (in/ft²) equals to 1.384 x root zone depth, in feet.
- Root Zone Storage actual (RZSA) was calculated as the level of infiltration minus ET plus the previous month's RZSA. An initial RZSA was assumed to equal 0.3 inches.
- Recharge was calculated as RZSA minus RZSC. Zero was entered in cases where the RZSA value was less than RZSC (i.e. capacity exceeded actual, thus, no recharge to aquifer occurred during that month).

In summary, Table 3-6 shows an average annual precipitation of 34.80 inches per year and an average annual runoff of 13.73 inches per year. This results in an average annual infiltration of 21.07 inches. Through a

cyclical process of infiltration and evapotranspiration this water is captured in root zone storage and subsequently evapotranspired throughout the year.

With an assumed root zone depth of 5.5 feet, the maximum actual root zone storage of water reaches a value of 7.46 inches during the month of April. This value is below the calculated root zone storage capacity for the assumed soil conditions at the Greiner's Lagoon site of 7.61 inches. Therefore, no percolation below the root zone system should occur at the Greiner's Lagoon site based on historical average precipitation and temperature conditions, assuming an effective root zone depth of 5.5 feet.

It is recognized that the water balance described herein is approximate and may not reflect the dynamics of singular storm events, snowfall, temperature variation, and other climatological events.

Allometry Correlation Curves

To predict the expected water lost due to plant transpiration as well as leaf interception, an allometry correlation curve was used which estimates transpiration as a function of plant biomass for tall grasses. The allometry correlation curve is presented in Figure 3-2. During the first year after vegetation is planted, the plant biomass is estimated to be 200 g/m^2 . A year after the vegetation is established, the plant biomass is estimated to be 400 g/m^2 . Leaf interception is conservatively estimated to be equal to 20% of the plant transpiration rate.

Table 3-4 presents the results of the estimated transpiration and leaf interception rates. A range of 9.4 inches per year during the first year to 28.0 inches per year once mature, is expected. This estimate correlates well with the HELP model results.

Summary

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Based on the results of all three analyses, it is clear that a root zone depth of the order of 6 to 12-feet (typical tall grass root depth), coupled with a grading plan that maximizes storm water runoff, will be effective at minimizing percolation below the root zone system (i.e. providing adequate root zone storage capacity).

In addition to the evapotranspiration benefit, contaminants in the impacted soil and shallow saturated zone beneath the tall grasses (whose depth may extend 15 feet below the surface) will be subject to phytostabilization, rhizodegradation, phytoaccumulation, phytovolatilization, and/or phytodegradation.

Phytoremediation Technology Selection Impacts

- Deeply rooted grass (greater than 5.5 feet) will minimize or eliminate the percolation of storm water at the site; and
- Contaminants in the impacted soil and shallow saturated zone beneath the tall grasses (whose root depth may extend 15 feet below the surface) will be subject to phytostabilization, rhizodegradation, phytoaccumulation, phytovolatilization, and/or phytodegradation.

3.7 HYDRAULIC BARRIER/REMEDIATION BY TREES

Trees can be used as a hydraulic barrier at sites to minimize or prevent ground water migration. Fast growing deep-rooted trees such as poplars can be used to take-up and transpire ground water. Typical water and transpiration rates are shown in Table 3-5.

Trees must be in contact with the ground water in order to uptake and ultimately transpire the groundwater. The depth of root penetration will control the amount of groundwater removal. For tree species, rooting depths may extend to 20 feet below the surface.

In addition, trees can be used to remediate contaminants in the shallow ground water via phytostabilization, rhizodegradation, phytoaccumulation, phytovolatilization, and/or phytodegradation.

Phytoremediation Technology Selection Impacts

- Fast-growing deep-rooted trees such as poplars can be used as hydraulic barriers at the site in the shallow ground water.
- Trees can be used to remediate contaminants in the shallow ground water via phytostabilization, rhizodegradation, phytoaccumulation, phytovolatilization, and/or phytodegradation.

3.8 CONCLUSIONS

The results of the assessment are that phytoremediation technology can be used at the site. Phytoremediation should be used for on-site soils since they pose a risk slightly above benchmarks, but well within acceptable cancer risk ranges, for Aroclor 1254 and bis(2-Ethylhexyl)phthalate. Additionally, phytoremediation technology should be used for the on-site

shallow saturated zone since it poses a risk slightly above benchmarks from benzene, 4-methylphenol, toluene, and ethylbenzene.

On-Site Soils

- Since impacted on-site soils in the Consolidation Area average 17 feet thick, with primary impacts appearing at less than 10 feet below grade, selection of a vegetative species with deep roots is required. Native tall grasses or trees are vegetative species with deep roots.
- Due to the ecological risk, on-site soils should be covered with a foot of cover to minimize wildlife exposure.
- The soft spots at the north side of the site should be amended with soil to improve soil quality for plant growth.
- The soil at the site needs to be amended with sulfur to lower pH. Species tolerant of high pH soil is preferred.
- To provide for occasions of dry weather, drought tolerant species should be used.
- Perennial vegetation should be used that grows from mid-April to the end of October.
- A species should be selected that has been shown to grow in oil stained soils.
- A species should be selected that has been shown to degrade PCBs and semi-volatile organic compounds.

Based on the above, a vegetative cover for infiltration control and surface soil remediation should be applied to the 3.2 acres of impacted soil at the site. Selection of vegetation and a preliminary conceptual design of the cover are discussed in Section 4.0.

On-Site Shallow Saturated Zone

- Since the on-site shallow saturated zone is generally encountered between 4 to 15 feet below grade at the site, selection of a vegetative species with deep roots is required. Native tall grasses or trees are vegetative species with deep roots.
- A species should be selected that has been shown to degrade volatile organic compounds.

- Perennial vegetation should be used that grows from mid-April to the end of October.
- A species should be selected that prevents shallow ground water from migrating into or from the site.

Based on the above, a vegetative cover for infiltration control and shallow saturated zone remediation should be applied above the impacted shallow saturated zone [vegetative cover over impacted soil (see above) would include the impacted shallow saturated zone]. In addition, a ground water hydraulic barrier with the additional benefit of remediation should be applied around the perimeter of the site. Selection of vegetation and a preliminary conceptual design of the grasses and trees are discussed in Section 4.0.

4.0 CONCEPTUAL IMPLEMENTATION OF PHYTOREMEDIATION

The site will be covered with a vegetative cover and surrounded with a perimeter barrier of trees.

4.1 VEGETATIVE COVER

The vegetative cover will intercept rain and control infiltration by taking up significant volumes of water from the subsurface. This is a form of hydraulic control by the plants. Additionally, portions of the site in contact with the plant roots will be subject to rhizodegradation, phytodegradation, and phytovolatization resulting in reduction of levels of constituents of concern at the site.

Selection of Plant Species

Based on the criteria of selection listed in Section 3.8, the vegetative species to be used at the site is switchgrass (Panicum virgatum). Switchgrass is a summer perennial grass that is native to North America. It is a natural component of the tall-grass prairie. Because it is native, it is resistant to many pests and plant diseases and grows quickly. It is also very tolerant of poor soils, flooding, and drought, and is winter hardy. Switchgrass produces well on shallow, rocky soils and grows best on loams and sandy loams, which is the soil-type at this site. Switchgrass grows to 5 to 6 feet tall and is fully mature in 3 years. It has a huge, permanent root system that penetrates between 6 to 12 feet into the soil and weighs 6 to 8 tons per acre above ground. According to several studies, there has not been any toxicity of grasses found due to petroleum compounds, nor should the presence of oily sludge soil affect the root depth. Switchgrass is known for its tolerance of a variety of soil types.

Switchgrass has been used at other sites using phytoremediation, specifically for hydraulic control. Additionally, studies have been conducted that demonstrate that switchgrass can be used to degrade polyaromatic hydrocarbons (PAHs), and several studies have concluded that switchgrass may be able to degrade PCB compounds. Some sites using switchgrass are as follows:

- Site in Alabama for petroleum impacted soil with high TPH.
- Site in Butte, Montana for PAHs in soil.
- Site in Newark, New Jersey for PAHs in soil.

Site in Texas for PAHs in petroleum impacted soil.

Please see Appendix B and Tables 4-2 and 4-3 for a summary of such sites and additional case studies, where available.

Conceptual Implementation

The area to be covered at the site is 3.2 acres (see Figure 4-1). All existing vegetation will be cleared. Soil at the north side of the site will be amended with fill soil down to two feet to improve soil quality in the soft areas. The entire site will be amended with sulfur to lower soil pH. After sulfur addition, 12 inches of topsoil will be applied across the site.

Broadcast spreading of the switchgrass seed will take place in late April (the best time of the year for seed germination). In order to ensure rapid growth, the site will be watered weekly during the first year by use of a water truck. Fertilizers will be applied if required.

The cost to implement this cover is provided in Table 4-1.

4.2 PERIMETER TREE BARRIER

Trees will be used to create a hydraulic barrier around the site and minimize or prevent shallow zone groundwater migration. Additionally, ground water in contact with the tree roots will be subject to rhizodegradation, phytodegradation, and phytovolatization resulting in reduction of levels of constituents of concern at the site.

Selection of Plant Species

Based on the criteria of selection listed in Section 3.8, the vegetative species to be used as the tree barrier are poplar trees (hybrid poplar and cottonwood). These poplars evolved initially under moist conditions, thereby never developing a system to conserve water. They are able to capture ground water, while working to reduce contaminant levels, and hindering contamination migration. Poplars are already growing near the site and they are tolerant to a broad range of soil, in a variety of changing climates, including times of drought. Their roots will extend down to 20 feet below ground surface. The growth rate of the poplars is 8 to 10 feet in their first 3 to 5 years. Both hybrid poplar and cottonwood are to be used to increase the biodiversity of the tree barrier.

Poplars have been used at other sites using phytoremediation, for hydraulic control and degradation of organic constituents. Additionally, studies have been conducted that demonstrate that hybrid poplars can be used to degrade PAHs and BTEX constituents. In Ohio, poplars are being used or proposed at the following sites (Appendix C):

- Site in Toledo, Ohio; landfill with SVOC, metal, PCB and pesticide impacts to soil and ground water.
- Site in Elmore, Ohio with TCE impacts to ground water.
- Site in Uniontown, Ohio; municipal solid waste landfill with VOC impacts.
- Site in Columbus, Ohio with volatile petroleum products in soil.
- Site in Heath, Ohio; former refinery with BTEX and TPH impacts to soil and ground water.
- Site in Piketon, Ohio; gaseous diffusion plant with TCE, DCE and vinyl chloride impacts to ground water.
- Site in Hocking County, Ohio; landfill with VOC impacts.
- Site in Cincinnati, Ohio; landfill with VOC and metal impacts.

Please see Tables 4-2 and 4-3 for additional case studies.

Conceptual Implementation

Trees will be planted around the perimeter of the site (see Figure 4-1). For purposes of this conceptual implementation, it was assumed that two rows of trees will be planted. Final tree density will be based on the site specific shallow saturated zone hydraulic yield.

Poplars have a narrow crown ideal for dense planting. Therefore, planting trees on 10-20 foot centers, based on expected canopy and root circle diameter at maturity, will be adequate space to establish an effective barrier. Historically, sites have planted trees 10 feet apart. In order to completely surround the site on all sides, preventing migration of the groundwater off site, 453 trees will be required (2 rows spaced with 10 feet between trees, 10 feet between rows, surrounding the site).

North Side: 307.5′ - Row 1, 30 trees, Row 2, 29 trees South Side: 303.7′ - Row 1, 29 trees, Row 2, 28 trees East Side: 877.5′ - Row 1, 87 trees, Row 2, 86 trees West Side: 858.7′ - Row 1, 85 trees, Row 2, 84 trees

TOTAL: 453 REQUIRED TREES

These calculations assume the second row of trees is situated so the trees are aligned staggered to those in the first row.

The poplars will be planted as long cuttings that will root and grow rapidly in the first season. In order to ensure rapid growth, the site will be watered weekly during the first year by use of a water truck. Fertilizers will be applied if required.

The cost to implement this barrier is provided in Table 4-1.

5.0 CONCLUSIONS

Phytoremediation can be implemented at the site using a tall grass cover and a ground water tree barrier. The northern portion of the site will be amended with soil to improve soil quality in the soft areas. Soil pH will be lowered through the application of sulfur. One foot of topsoil will be placed on the impacted soils to help promote rapid root development and to minimize exposure to bare areas. Switchgrass will be used as the vegetation for the phytoremediation cover. Hybrid poplars and cottonwood will be used for the ground water tree barrier.

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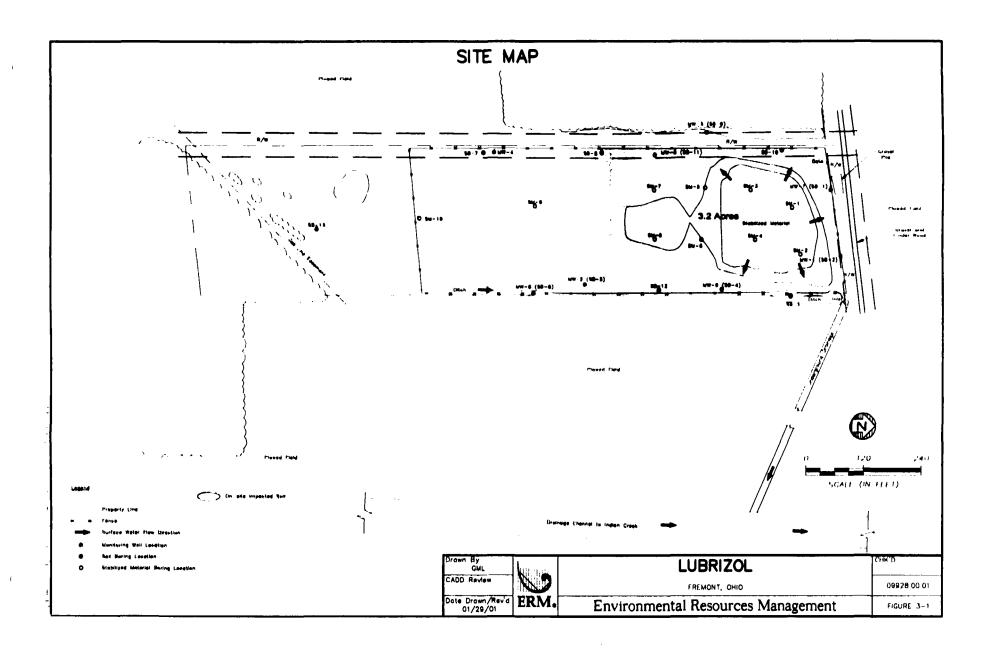
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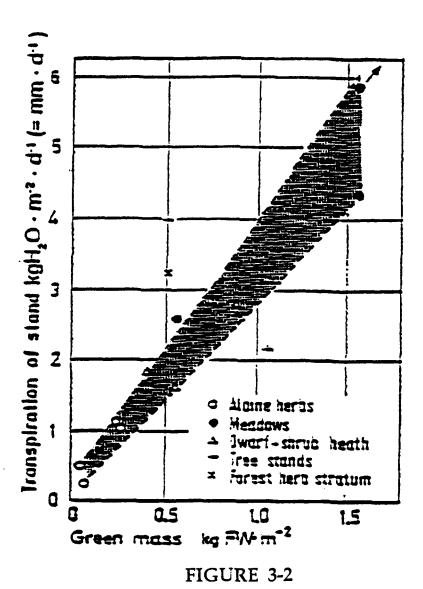
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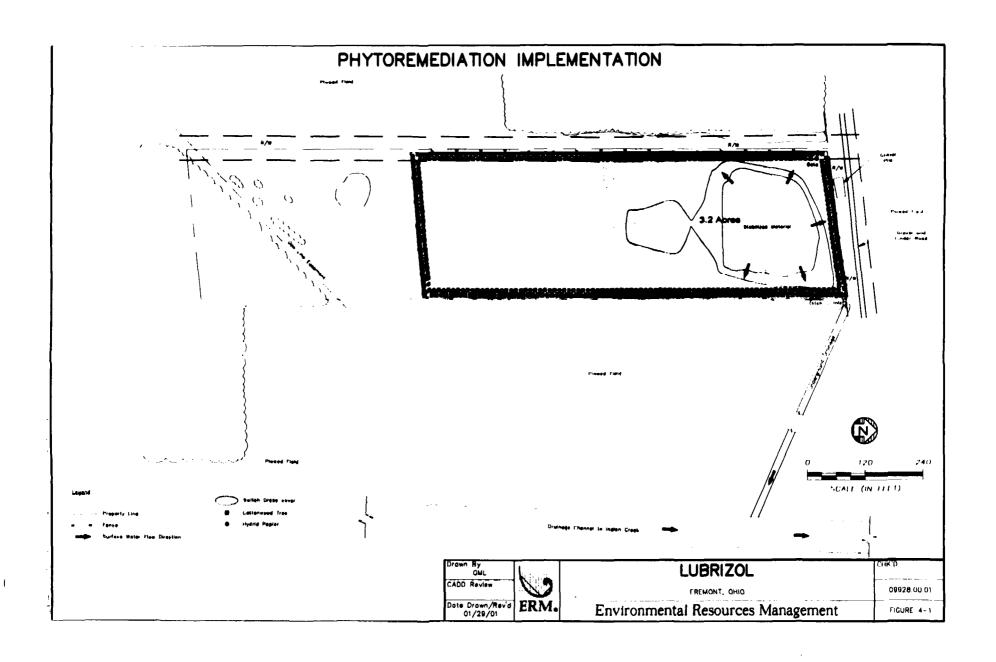
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Figures





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Tables

Table 3-1
Summary of Constituents of Potential Concern in On-Site Soil with EEQs Greater than One

Greiner's Lagoon Site Fremont, Ohio

	Maximum	Screening Level	••				
Constituent	Concentration	(ppm)		EEQ			
Volatile Organic Compounds (mg/Kg)							
Acetone	0.048	-		-			
Benzene	27	0.5	(a)	54			
Ethylbenzene	110	5	(a)	22			
Toluene	330	3	(a)	110			
Trichloroethene	9.5	5	(a)	1.9			
Xylenes (total)	520	5	(a)	104			
Semivolatile Organic Compound	s (mg/Kg)						
Butyl benzyl phthalate	86	-		-			
1,2-Dichlorobenzene	230	1	(a)	230			
1,4-Dichlorobenzene	91	1	(a)	91			
Di-n-butyl phthalate	36	-		-			
bis(2-Ethylhexyl)phthalate	4000	70	(a)	57			
Isophorone	0.1	-		-			
2-Methylnaphthalene**	130	5	(a)	26			
Naphthalene	86	5	(a)	17			
Phenol	430	1	(a)	430			
1,2,4-Trichlorobenzene	350	1	(a)	350			
Metals (mg/Kg)							
Cadmium	43 .7	5	(a)	8.7			
Lead	811	150	(a)	5.4			
Zinc	2470	500	(a)	4.9			
Pesticides/PCBs (mg/Kg)							
Aroclor 1254	38	0.05	(a)	760			

Notes:

ERM

⁽a) Evaluating Soil Contamination by Nelson Beyer. 1990. U.S. Fish & Wildlife Service Biological Report 90(2), Pgs.2, 3, 5 & 7.

⁽b) USEPA. 1995. Revised Region III BTAG Screening Levels.

^{**}Screening level for naphthalene.

[&]quot;-" Indicates no screening level available

Table 3-2 Soil Fertility Samples Greiner's Lagoon Site Fremont, Ohio

	T	
Compound	Composite 2, 6	Composite 3, 4, 5, 7
Ammonia Nitrogen	340	320
Fixed Solids (% of Total Solids)	80.3	92.9
Nitrate Nitrogen	28	110
pH S.U.	12	12
Total Kjeldahl Nitrogen	780	590
Total Nitrogen	810	700
Total Solids (% of Sample)	81.3	78.8
Total Sulfur (% by Wt.)	0.31	0.10
Total Phosphorus	1,600	1,300
Aluminum	5,400	4,700
Boron	22	19
Calcium	130,000	96,000
Copper	86	22
Iron	12,000	8,200
Magnesium	41,000	9,000
Manganese	200	190
Molybdenum	25	4.5
Potassium	910	1,300
Zinc	1,200	160

Note: All results in mg/kg except where noted.

Table 3-3

List of Observed Vegetation Within Major Habitat Covertypes Greiner's Lagoon Site

Fremont. Ohio

Wooded Areas A & B-Mixed Deciduous Woods

Tree Canopy

Burr Oak

Quercus macrocarpa

Dogwood

Cornus sp.

Chestnut Oak

Quercus montana

Ironwood

Carpinus caroliniana

White Oak

Quercus alba

Red Oak

Quercus rubra

Multiflora Rose Blackberry

Shrub Understory

Rosa multiflora

Rubus sp.

Swamp White Oak **Black Cherry**

Ouercus bicolor Prunus serotina

Shagbark Hickory

Carya ovata

Butternut **Black Walnut** Juglans cinerea Juglans cinerea

Eastern Cottonwood

Populus deltoides

American Sycamore American Beech

Platanus occidentalis

Hackberry

Fagus grandifolia Celtis occidentalis

Red Maple

Acer rubrum

Sapling/Shrubs

Goldenrods

Salidago sp.

Teasel

Dipsacus sylvestris

Aster

Aster sp.

Evening Primrose Garlic Mustard

Oenothera biennis Alliana officinalis

Common Burdock Stiff-haired Sunflower Arctium minus Helianthus hirsutus

Stinging Nettle

Urtica dioica

Cocklebur

Xanthium chinense

Foxtail Grass

Setaria sp.

Black Locust

Robinia pseudoacacia

Dogwood Black Willow Cornus sp. Salix nigra

Marsh Area

Sedges

Carex sp.

Ditch

Reed

Phragmites communis

Stressed Vegetation and Bare Area

Goldenrod

Salidago sp.

Aster

Aster sp.

Chasses

Poa sp.

5/17/01

Table 3-4 Estimated Transpiration Rates of Tall Grasses Greiner's Lagoon Site Fremont, Ohio

Year	Phase	Assumed Plant Biomass (g/m²)	Estimated Transpiration Rate (inches/year)	Estimated Leaf Interception Rate (in/year)	Estimated Total Loss due to Transpiration and Leaf Interception (in/year)
0-1	Establish grasses	200	7.8 to 13.0	1.6 to 2.6	9.4 to 15.6
>1	Mature grasses	400	15.5 to 23.3	3.1 to 4.7	18.6 to 28

Table 3-5
Estimated Transpiration Rates of Trees
Greiner's Lagoon Site
Fremont, Ohio

Plant Name	Plant Type	Transpiration Rate
Cottonwood	2 Year Old Tree	2.0-3.75 gpd per tree
Hybrid Poplar	5 Year Old Tree	20- 40 gpd per tree
Cottonwood	Full, Mature Tree	50-350 gpd per tree
Weeping Willow	Full, Mature Tree	200-800 gpd per tree

TABLE 3-6

Greiner's Lagoon Phytoremediation Water Balance Calculations

Ini	itial	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
Precipitation (inches) [weather.com-Fremont]		3.10	2.30	2.80	2.70	1.80	1.70	2.70	3.00	3.60	3.90	3.80	3.40	34.80
S ⁽¹⁾ = potential maximum retention (inches)		2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	į
Runoff ⁽²⁾ (SCS Curve Number Method) (inches)		1.26	0.71	1.04	0.97	0.41	0.36	0.97	1.19	1.64	1.88	1.80	1.49	13.73
Infiltration (inches) [Precipitation - Runoff]		1.84	1.59	1.76	1.73	1.39	1.34	1.73	1.81	1.96	2.02	2.00	1.91	21.07
Mean Temperature (Deg. F) [weather.com-Fremon	t]	64.0	52.0	41.0	29.0	23.0	26.0	36.0	48.0	59.0	69.0	73.0	70.0	
PET (Thornthwaite Method) (inches) [see Table 2]		3.27	1.82	0.67	0.00	0.00	0.00	0.24	1.38	2.65	3.92	4.46	4.05	22.46
ET (Actual) (inches)		2.14	1.59	0.67	0.00	0.00_	0.00	0.24	1.38	2.65	3.92	4.46	4.05	21.10
														•
Root Zone Depth (RZD) (feet) (Assumed value)		5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	
Root Zone Storage Capacity ⁽³⁾ (RZSC) (in/ft ²)		7.61	7.61	7.61	7.61	7.61	7.61	7.61	7.61	7.61	7.61	7.61	7.61	
).3	0.00	0.00	1.08	2.81	4.20	5.55	7.03	7.46	6.77	4.87	2.42	0.28	
														•
Recharge (inches) [RZSA - RZSC]		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

^{(1) -} Land use description (pasture or range land, poor condition); Type II - Average moisture conditions, Soil Group B - moderate infiltration rate, well drained soils S = (1000/CN) - 10; CN = 79

^{(2) -} Runoff = (Precipitation+-0.2S)²/(Precipitation+0.8S)

^{(3) -} Root Zone Storage Capacity based on Silt Loam soil type (Field capacity = 24%, Wilting point = 15%, Specific weight = 80 lb/ft3) yields RZSC = 1.384 * RZD

TABLE 3-7

Greiner's Lagoon
Thornthwaite Method Calculations

Month	Mean Monthly Temperature (F)	Mean Monthly Temperature (C) = Te	Monthly Heat Index $I = (Tc/5)^{1.514}$	PET = Potential Evapotranspiration (mm) PET = 16.2 * (10 Tc/l) ^a	PET = Potential Evapotranspiration (in.)
September	64	17.8	7.1	83.06	3.27
October	52	11.1	3.4	46.21	1.82
November	41	5.0	1.0	17.07	0.67
December	29	-1.7	•	•	0.00
January	23	-5.0	•	-	0.00
February	26	-3.3	•	-	0.00
March	36	2.2	0.3	6.20	0.24
April	48	8.9	2.4	34.98	1.38
May	59	15.0	5.4	67.20	2.65
June	69	20.6	8.8	99.56	3.92
July	73	22.8	10.3	113.16	4.46
August	70	21.1	9.2	102.92	4.05

Annual Heat Index I = (Sum September through August):

48.0

Total PET (Annual):

22.46

inches

$$a = (0.000000675 + I^3) - (0.0000771 + I^2) + (0.0179 + I) + 0.492 =$$

1.25

Table 4-1
Phytoremediation Implementation Cost Estimate
Greiner's Lagoon Site
Fremont, Ohio

Task	Description	Unit	Quantity	Unit Cost	Total Cost
	Capital				
1	Site Preparation				
	Vegetative Clearing	асте	3.2	\$2,573	\$8,234
	Grading	MSF	139.4	\$ 5	\$697
	Sulfur addition	acre	3.2	\$282	\$904
	Soil tilling	MSF	139.4	\$ 5	\$697
	Soft spots - amend top 2' with soil	CY	10325	\$11	\$115,089
2	Addition of 1' topsoil and Grass seeding	acre	3.2	\$27,800	\$88,960
3	Tree Planting	each	453	\$30	\$13,590
4	Fertilizer - twice during first year	acre	6.4	\$282	\$1,807
5	Irrigation - weekly during growing season of first year	day	26	\$36 5	\$9,490
6	Surface Water Management	ls	1	\$76,000	\$76,000
7	Site Access Restriction	lin ft	2280	\$28	\$63,84 0
8	Engineering				
	Design	ls	1	\$75,000	\$75,000
	Oversight	ls	1	\$30,000	\$30,000
9	Legal, Insurance, Permits	ls	1	\$100,000	\$100,000
	Subtot	al			\$ 584,308
	10% Contingence				\$ 58,431
	Estimated Total Co	-		:	\$ 642,738
			•		
	O&M	_			
1	Cover inspections and maintenance	ls			\$ 10,000
2	Surface water management	ls		\$ 3,000.00	\$ 3,000
3	GW monitoring	ls		•	\$ 10,000
4	Legal, Insurance, Permits	ls	1		\$ 4,000
5	Engineering Oversight	ls	1	\$ 5,000.00	\$ 5,000
	Subtot	al			\$ 32,000
	10% Contingence				\$ 3,200
	Estimated Annual O&M Co	-		:	\$ 35,200
	Total 30-Year O&M Cost	ts			\$ 1,056,000
		i	0.05		
		n	30		
	•	NPCF	15.372451		
	30-Year NPC Cost [Factor = (1+i)n - 1/i(1+i)n = 9.42 (i = 10%)]	NPC			\$ 541,110
	Total Estimated Capital and O&M Co	st			\$ 1,698,738
	Total Estimated Net Present Cost (NPC) for Capital and O&I		•		\$ 1,183,849
	Total Politimen Liet Liebern Cost (111 C) 101 Cabira Will Cost	**			Ψ 1,100,0 1 7

Table 4-2: Case Studies - Phytoremediation of Petroleum Hydrocarbons

Project Name/Location	Primary Contaminant	Project Description / Status
Named Exception	Contanunant	
Applied PhytoGenetics, Inc.	PAH, phenolics and toxic heavy metals.	APGEN has an ongoing contract to assess various phytoremediation applications for contaminated soils and lagoon sediments with high-level PAHs, phenolics and toxic heavy metals. APGEN characterized the soil contamination and collected samples for use in a laboratory greenhouse growth study, and the successful results led to their implementation of a field demonstration of phytoremediation at the site. (Glass, David. "The 2000 Phytoremediation Industry: U.S. and International Industry Directory with Company Profiles" February 2000)
Exxon	ТРН	Exxon is looking into the factors that effect the rate and extent of remediation. They have found that inoculating soils with special microorganisms is more effective at degrading TPHs than stimulating naturally occurring microorganisms with nutrients. Exxon has conducted laboratory studies of PAH biodegradability in aged refinery soil. Researchers have investigated the typical composition of aged refining hydrocarbons, and found that many of the more toxic compounds were soluble enough to be affected by plants. The removal of PAHs is strongly affected by the amount of nutrients added. (RTDF 1998 Conference Manual)

Table 4-2: Case Studies - Phytoremediation of Petroleum Hydrocarbons (continued)

Project Name/Location	Primary Contaminant	Project Description / Status
Union Carbide, Texas	PAH	John Fletcher of the University of Oklahoma described a study of a 1-acre site in Texas, which he is undertaking in conjunction with Union Carbide. The study has found that plants are contributing to the disappearance and degradation of contaminants on the site. The site was taken out of use 20 years ago. Throughout the site, PAH levels are lowest within the top foot of sol and are highest within the sludge. Fletcher discussed that the root systems provide binding surfaces that prevent contaminants from leaching. Root systems foster the growth of microbes, and the aeration provided by root systems, has had a significant impact on microbial activity at the zite. Fletcher said that 196 species of PAH-degrading bacteria have been identified at the site. The total microbial population of PAH degraders is highest next to the plant roots. (RTDF 1998 Conference Manual)
Widen, West Virginia	BTEX	Cleanup of a BTEX plume has been expedited by the installation of a phytoremediation system at this closed underground storage tank facility in sandy soil with shallow groundwater. In 1994, the facility contracted outside consultants to propose a remediation method that did not involved removal of soils. BTEX concentrations in the downgradient well decreased to nondetectable concentrations by June 1997. "The 2000 Phytoremediation Industry: U.S. and International Industry Directory with Company Profiles" Glass, David J. February 2000.

Table 4-2: Case Studies - Phytoremediation of Petroleum Hydrocarbons (continued)

Project Name/Location	Primary Contaminant	Project Description / Status
Michigan Manufacturing Facility	TCE and chlorinated hydrocarbons	This site uses hybrid poplars to treat low concentrations of TCE and other chlorinated hydrocarbons from a shallow aquifer at a Michigan manufacturing facility. Following a site assessment, phytoremediation was chosen as the remedial option, and approximately 150 trees were planted at this site in 1996. Significant declines in downstream TCE concentrations were seen after one year (Glass, David. "The 2000 Phytoremediation Industry: U.S. and International Industry Directory with Company Profiles" February 2000. p. 47.)
Cantrall, Illinois		A former agricultural chemicals storage facility in Cantrall, Illinois is working to remediate agricultural chemicals in shallow soil and groundwater. The

Cantrall site is approximately two acres in size and was planted with over 200 hybrid poplar trees in 1992. A groundwater collection/irrigation system was installed in conjunction with the trees to serve as a recirculating in-situ treatment system. The contaminant plume that was migrating off-site consisted primarily of elevated nitrate nitrogen. Levels in nearby residential wells exceeded 150 ppm (primary drinking water standard = 10 ppm). The downgradient groundwater collection wells were used to intercept the plume and supply an onsite drip irrigation system. Subsequent groundwater monitoring has shown a reduction in nitrate nitrogen in the downgradient plume from >150 ppm to approximately 50 ppm. This project began in 1987 in response to a request for alternatives to soil removal and disposal. After six years, many of the trees are approaching 40 feet in height. http://www.thomasconsultants.com/cantrall.html

Table 4-2: Case Studies - Phytoremediation of Petroleum Hydrocarbons (continued)

Project Name/Location	Primary Contaminant	Project Description / Status
Chevron, Various locations	TPH, PAH	 Refinery holding pond, CA. Hydrocarbons (TPH, PAHs). Tall fescue, grasses, legumes, bulrush. Some reduction in TPH. Refinery land farm, CA. Hydrocarbons. Poplar, grasses, and broadleaf species. Water Board acceptance. Tank facility, Nigeria. Hydrocarbons. Grass. Visual improvement. No phytotoxicity. Refinery land treatment unit, OH. TPH, PAH. Rye, legume, fescue, trees. In collaboration with US EPA, Ohio EPA, and University of Cincinnati. In progress. (Glass, David. "The 2000 Phytoremediation Industry: U.S. and International Industry Directory with Company Profiles" February 2000. p 51)
Chevron, California	ТРН, РАН	Chevron is operating a test site in California, which contains sludge from oil operations. The site has been drained, dried, tilled and divided in to four test plots. Three plots have been planted with different grass mixtures, and one has been left unvegetated. After 15 months, degradation of PAHs has occurred and TPH levels have gone down in each of the plots, including the unvegetated plot. Degradation rates are faster in the vegetated plots. (1998 RTFD Training Manual)
Chevron, Utah	Benzene	A marketing terminal in Utah with benzene contamination. The site has been planted with alfalfa for two years. The site contains monitoring wells and has been sampled for benzene degradation. Chevron has found that, after 2 years, leaching is being preveted and benzene has been degrading. (1998 RTFD Training Manual)

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Table 4-2: Case Studies - Phytoremediation of Petroleum Hydrocarbons (continued)

Project Name/Location	Primary Contaminant	Project Description / Status
Chevron		A drained oxidations pond containing residual petroleum sludge. One side of the site has been tilled and kept free of vegetation, and the other side has been tilled and planted for two years. Chevron plans to revegetate the clear side with native species. The planted side now contains a layer of topsoil. Prior to planting, Chevron may perform an ecological risk assessment, which will consider the type of wildlife that the planted side may attract and the risks to that wildlife. (1998 RTFD Training Manual)
Chevron		A land farm for which Chevron has received regulatory approval for a vegetative cap. The soil will be mounded for runoff control, and the site will be planted with grasses, broadleafs and trees. (1998 RTFD Training Manual)

ERM 5/17/01

Table 4-2: Case Studies - Phytoremediation of Petroleum Hydrocarbons (continued)

Project	Primary	Project Description / Status
Name/Location	Contaminant	Troject Description, Status
Tunicy Eccution	Comminant	
Chevron, Utah		Sheldon Nelson (Chevron) described a field research project in Ogden, Utah, being conducted to study the ability of poplars to act as a hydraulic barrier to solute transport in groundwater. Soils at the site are of low permeability, and the weather is good for transpiration. Gasoline and diesel components are dissolved in the groundwater, which is eight feet below the surface. Three rows of poplars were planted six feet apart and perpendicular to the GW flow. Even though the trees were very young, having been planted in 1995 and 1996, it appeared that the trees were lowering the water level by 1.5 to 2 inches. Using simple geohyrological calculations and treating the trees like low-flow pumping wells, Nelson calculated that the trees were using 13 gallons of water per day per tree. He then calculated the pumping rate required to achieve hydraulic control of the groundwater at the site, and estimate a pumping rate of 25-30 gallons of water per day per tree. The conclusion is that it would theoretically be possible to use trees to contain GW at the Ogden site. (1998 RTFD Training Manual)

Table 4-2: Case Studies - Phytoremediation of Petroleum Hydrocarbons (continued)

Project	Primary	Project Description / Status
Name/Location	Contaminant	, , , , ,
U.S. Army testing facility, Maryland		In Maryland at a U.S. Army testing facility, hybrid poplar trees were planted in a one-acre area over a shallow ground water plume contaminated with organics from several toxic disposal pits. The poplar trees act as hydraulic pumps to prevent the spread of contaminants to a nearby marsh. In addition to hydraulic control, researchers have determined that phytovolatilization and rhizofiltration are other mechanisms by which the system is treating the contaminated plume. After the second growing season, the trees are successfully containing the contaminated ground water plume with rates estimated at 2-10 gallons of water per day for each tree. In addition, preliminary results have indicated that the poplar trees are degrading the contaminants in the ground water plume. (EPA's "A Citizen's Guide to Phytoremediation")
Federated Co- operatives Limited, Saskatchewan		Federated Co-operatives Limited, a marketing and distribution cooperative, has been exploring phytoremediation's potential for hydrocarbon contamination since 1996, and has been conducting field trials since 1997. The initial field trials, begun in 1997, involved the use of Balsam poplars to treat a groundwater plume contaminated with hydrocarbons (weathered diesel and gasoline) at a site in Kelvington, Saskatchewan. Initial results show that a majority of the trees are surviving and growing normally; performance results have not yet been announced. "The 2000 Phytoremediation Industry: U.S. and International Industry Directory with Company Profiles" Glass, David J. February 2000. p 67

 $Table \ 4-3: Case \ Studies - Phytoremediation \ Application \ in \ Cold-Weather \ Climates$

Project Name/Location	Primary Contaminant	Media and Properties	Vegetative Type	Date Planted/ Results, if available
Farm cooperative, WI	Ammonia	Soil and Groundwater	Hybrid poplars and grasses	1997
Green II Landfill, OH	VOCs and other organics in leachate	Soil and leachate	Hybrid poplars and hybrid willows	1998
Former Landfill, Logan, OH	Nitrate and ammonium	Soil and groundwater	Hybrid poplars and hybrid willows	199
Bofors-Nobel, MI	Pesticides, herbicides, dyes	Soil and sediments	Trees and wetland plants	1999
Railroad facility site, Fond du Lac, WI	Petroleum Hydrocarbons	Soil	Combination of grass species	1999
Cantrall, IL	Pesticides, herbicides	Soil and groundwater	Hybrid poplars	1992
Closed Disposal Facility, IL	Petroleum Hydrocarbons	Surface Water	Groundcover plants in combination with phreatophyte trees	
Columbus, OH	Volatile Petroleum Hydrocarbons	Soil	Hybrid poplars, ground cover	1997
Farm Service Facility, MN	Ammonia	Soil	Hybrid poplars and grass	1998

Table 4-3: Case Studies - Phytoremediation Application in Cold-Weather Climates (continued)

Project Name/Location	Primary Contaminant	Media and Properties	Vegetative Type	Date Planted/ Results, if available
Former Farm Market, WI	Pesticides, nitrates, ammonium	Soil and groundwater	Hybrid poplars	1992
Petroleum Processing Facility, PA	TPH in fill soil, BTEX	Ash and cinder with soil fill	Hybrid poplars and hybrid willows	1996
Indianapolis, IN	Pesticides/ Herbicides	Groundwater	Hybrid poplars	1995
Manufacturing facility, MI	Halogenated volatiles	Groundwater, silty clay soil	Hybrid poplars	1996. Significant declines in downstream TCE concentrations after one year.
Manufacturing facility, WI	TPH in fill soil	Ash and cinder with soil fill	Hybrid willow	1996
Metal Plating Facility, Findlay OH	Heavy Metals, halogenated volatiles	Soil and groundwater	Indian Mustard and Hybrid poplars	1997
Nu-Glo Site, OH	TCE, PCE	Soil and groundwater	Hybrid poplars and willows	1998
Ohio location	Volatile petroleum products	Soil and shallow groundwater	Hybrid poplars and rye grass	1997
Ohio Site	Volatile petroleum products	Shallow groundwater	Hybrid poplars	1997
Piketon DOE facility, OH	Halogenated volatiles	Shallow and deep groundwater	Hybrid poplars and rye grass	1999

Table 4-3: Case Studies - Phytoremediation Application in Cold-Weather Climates (continued)

Project Name/Location	Primary Contaminant	Media and Properties	Vegetative Type	Date Planted/ Results, if available
Reliable Plating Site, OH	TPH in fill soil and BTEX in groundwater	Excavated soil	Hybrid poplars and hybrid willows	1995
Chevron landfarm, OH	Cd, Cr, Cu, Pb, Hg		Grasses, broadleaf species	Some metals taken up by plants
Edward Sears Site, NJ	TCE	Groundwater at 8 feet	Hybrid poplars	1996
Aberdeen Proving Grounds, MD	TCE	Groundwater	Hybrid poplars	1996
Kaufman & Minteer, NJ	PCE	Groundwater	Hybrid poplars	1997
Solvent Recovery Systems of New England, CT	Mixed Solvents	Groundwater	Hybrid poplars	1998
Twin Cities Army Ammunition Plant, MN	Metals	Soil	Corn, Indian Mustard	1998
Wisconsin site, WI	BTEX and TPH	Soil	Species under consideration	1999

Appendix A HELP Model Results

PRECIPITATION DATA FILE: C:\help3\lubrizol\DATA4b.D4
TEMPERATURE DATA FILE: C:\HELP3\lubrizol\DATA7b.D7
SOLAR RADIATION DATA FILE: C:\HELP3\lubrizol\DATA13b.D13
EVAPOTRANSPIRATION DATA: C:\HELP3\lubrizol\DATA11c.D11
SOIL AND DESIGN DATA FILE: C:\HELP3\lubrizol\DATA10b.D10
DUTPUT DATA FILE: C:\HELP3\lubrizol\goodc.OUT

TIME: 14:33 DATE: 5/ 9/2001

TITLE: Greiner's Lagoon Site - Good Stand of Tall Grass

NOTE: INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.

LAYER 1

TYPE 1 - VERTICAL PERCOLATION LAYER MATERIAL TEXTURE NUMBER 8

THICKNESS = 12.00 INCHES
POROSITY = 0.4630 VOL/VOL
FIELD CAPACITY = 0.2320 VOL/VOL
WILTING POINT = 0.1160 VOL/VOL
INITIAL SOIL WATER CONTENT = 0.3723 VOL/VOL

EFFECTIVE SAT. HYD. COND. = 0.369999994000E-03 CM/SEC

NOTE: SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY 4.90

FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.

LAYER 2

TYPE 1 - VERTICAL PERCOLATION LAYER MATERIAL TEXTURE NUMBER 11

THICKNESS = 210.00 INCHES

POROSITY = 0.4640 VOL/VOL

FIELD CAPACITY = 0.3100 VOL/VOL

WILTING POINT = 0.1870 VOL/VOL

INITIAL SOIL WATER CONTENT = 0.3054 VOL/VOL

EFFECTIVE SAT. HYD. COND. = 0.639999998000E-04 CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE # 8 WITH A GOOD STAND OF GRASS, A SURFACE SLOPE OF 3.% AND A SLOPE LENGTH OF 120. FEET.

SCS RUNOFF CURVE NUMBER	=	74.10	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	3.600	ACRES
EVAPORATIVE ZONE DEPTH	=	72.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	20.126	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	33.396	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	12.612	INCHES

GOODC.OUT

INITIAL SNOW WATER = 0.000 INCHES
INITIAL WATER IN LAYER MATERIALS = 68.602 INCHES
TOTAL INITIAL WATER = 68.602 INCHES
TOTAL SUBSURFACE INFLOW = 0.00 INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM TOLEDO OHIO

STATION LATITUDE = 41.36 DEGREES MAXIMUM LEAF AREA INDEX = 4.00 119 START OF GROWING SEASON (JULIAN DATE) = 286 END OF GROWING SEASON (JULIAN DATE) = EVAPORATIVE ZONE DEPTH = 72.0 INCHES = 9.40 MPH AVERAGE ANNUAL WIND SPEED AVERAGE 1ST QUARTER RELATIVE HUMIDITY = 72.00 % AVERAGE 2ND QUARTER RELATIVE HUMIDITY = 68.00 % AVERAGE 3RD QUARTER RELATIVE HUMIDITY = 74.00 % AVERAGE 4TH OUARTER RELATIVE HUMIDITY = 76.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR TOLEDO OHIO

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
1.99	1.80	2.64	3.04	2.90	3.49
3.26	3.19	2.53	1.94	2.41	2.59

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR TOLEDO OHIO

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC

23.10	25.80	35.40	47.80	58.60	68.00
71.80	70.10	63.20	51.70	39.30	28.10

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR TOLEDO OHIO

AND STATION LATITUDE = 41.36 DEGREES

AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 50

•						
_	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	1.86	1.68	2.61	3.08	2.88	3.88
	3.23	3.18	2.28	1.91	2.75	2.58
STD. DEVIATIONS	0.74	0.67	0.92	1.30	1.16	1.82
	1.63	1.46	1.08	1.10	1.32	1.13
RUNOFF						→
TOTALS	0.198	0.421	1.225	0.220	0.003	0.014
	0.006	0.004	0.000	0.002	0.002	0.125
STD. DEVIATIONS	0.283	0.498	0.824	0.377	0.014	0.041
	0.025	0.016	0.001	0.011	0.011	0.253
EVAPOTRANSPIRATION						
TOTALS	0.504	0.457	0.618	1.955	3.322	6.382
	6.080	4.404	2.320	0.851	0.484	0.405
STD. DEVIATIONS	0.083	0.096	0.224	0.542	0.698	0.495
	0.750	1.304	0.798	0.171	0.105	0.088

TOTALS 0.:	1752 0.1	490	0.1388	0.1199	0.1136	0.10
	0727 0.0					
	1488 0.1				0.1306	
0.	1745 0.1	968	0.2358	0.2369	0.1902	0.16
*******	*****	****	*****	*****	*****	*****
******	*****	****	*****	******	*****	*****
AVERAGE ANNUAL TOTALS &	(STD. DEVI	ATIO	NS) FOR YE	EARS 1	THROUGH	i 50
				~ ~		
	IN	CHES		CU. FEE	T	PERCEN
RECIPITATION	31.91	(4.658)	417054	1.9	100.00
UNOFF	2.221	(1.0594)	29025	5.17	6.960
VAPOTRANSPIRATION	27.781	(2.3372)	363048	3.44	87.051
		3 (1.45560)	23768	3.441	5.699
ERCOLATION/LEAKAGE THROUGH LAYER 2	1.8188	•				
	0.093		3.4661)	1212	2.77	0.291
LAYER 2	0.093	(
LAYER 2 HANGE IN WATER STORAGE	0.093	(
LAYER 2 HANGE IN WATER STORAGE	0.093	(
LAYER 2 HANGE IN WATER STORAGE	0.093	(
LAYER 2 HANGE IN WATER STORAGE	0.093	(
LAYER 2 HANGE IN WATER STORAGE	0.093 ******	(***	****	*****	*****	*****

GOODC.OUT

PRECIPITATION	2.91	38027.879
RUNOFF	3.098	40486.8047
PERCOLATION/LEAKAGE THROUGH LAYER 2	0.055471	724.88910
SNOW WATER	4.88	63812.1250
MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.4	1082
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.1	.752

	FINAL WATER	STORAGE AT	END OF YEAR 50	
,	LAYER	(INCHES)	(VOL/VOL)	
	1	2.9897	0.2491	
	2	69.6669	0.3317	
	SNOW WATER	0.585		

Appendix B Phytoremediation Projects-Switchgrass

Switchgrass Phytoremediation Projects

Site:

Unknown in Alabama

Contact:

Unknown

Agency:

Alabama Department of Environmental Management

Phone:

334-271-7700

Contaminants:

Volatile petroleum products in soil.

Phytoremediation technology established and closure granted.

Phytoremediation was chosen to remediate volatile petroleum products in soil with a TPH greater than 100 ppm. Switchgrass and other prairie grasses were planted on the site. Site was closed with TPH less than 10 ppm.

Site:

Pole Superfund Site (Wood Preserving Site), Butte, Montana

Contact:

Jim Harris

Agency:

US EPA

Phone:

406-441-1123

Contaminants:

PAHs and PCP in soil

Unknown status.

Phytoremediation was chosen to remediate PAHs and PCP in soil. Switchgrass and other prairie grasses were planted on the site.

Site:

.

Manufacturing Gas Plant, Newark, NJ

Contact:

Unknown

Agency: Phone:

Unknown Unknown

Contaminants:

Non-halogenated semivolatiles in soil

Unknown status.

Phytoremediation was chosen to remediate PAHs in soil. Switchgrass and alfalfa were planted on the site.

Site:

Surface Impoundment, Southeast, Texas

Contact:

Phone:

Unknown

Agency:

TNRCC

Additional Contact: Matt Peak

734-542-0740

Contaminants:

PAHs in soil

Phytoremediation technology established.

Phytoremediation voluntarily established on 32 acres. Switchgrass, Klein Grass and Johnsongrass planted on the site.

Appendix C Phytoremediation Projects-Ohio EPA

Ohio EPA Phytoremediation Projects

NWDO

Site:

North Cove Landfill, Toledo, Ohio

Contact:

Archie Lunsey

District:

Northwest District Office

Phone:

419-373-3035

Contaminants:

Soil and ground water, low levels of semi-volatile organic

compounds, metals, PCBs and pesticides.

Telephone conversation with Archie Lunsey.

Phytoremediation was chosen as one of the remedies for the site (in addition to soil cover and rip-rap). Currently evaluating plant species for phytoremediation with Cottonwood trees currently on-site (naturally). It is expected that the phytoremediation will reduce soil dermal contact and reduce moisture amounts.

Site:

Landfill

Contact:

Unknown

District:

Northwest District Office

Phone:

Unknown

Contaminants:

Ground water with TCE

Unknown status.

Hybrid poplar trees planted to remediate TCE in ground water.

NEDO

Site:

Industrial Excess Landfill, Uniontown, Ohio

Contact:

Larry Antonelli

District:

Northeast District Office

Phone:

330-963-1127

Contaminants:

Volatile Organic Compounds

Telephone conversation with Larry Antonelli.

U.S. EPA Region V and Ohio EPA involvement. PRP's propose using phytoremediation (Poplar trees with soil amendments). Currently approximately ½ of the landfill has Poplar and Willow trees (naturally). Agencies considering phytoremediation with monitored natural attenuation.

CDO

Site:

Former Heath Refinery-Ashland and Unocal

Contact:

Fred Meyers

District:

Central District Office

Phone:

614-728-3830

Contaminants:

Soil and Ground water-BTEX and TPH

Review of Work Plan

Consent Order-Ashland Inc. and Union Oil Company of California with State of Ohio. The project is being performed under the supervision of the Ohio EPA. Poplar trees were planted in June 1999 in a 2-acre area. The contamination extends from 5 to 15 feet below ground surface. Year 2000 was the first year of a five year treatability study. Performance monitoring will consist of tree growth measurements and soil, tree root, soil gas and ground water sampling and BTEX and TPH analysis.

Site:

Waste Oil Recovery Unit

Contact:

Unknown

District:

Central District Office

Additional Contact: Paul Thomas

Phone:

513-271-0092

Contaminants:

Soil with petroleum hydrocarbons

Phytoremediation Technology Established

Full-scale voluntary action by confidential company. Bermuda grass and hybrid poplar trees planted over one acre in 1997. Site consists of glacial soils with a depth of ground water of 6 feet below ground surface. Site receives approximately 36 inches of annual precipitation.

SEDO

Site:

Portsmouth Gaseous Diffusion Plant-Piketon, Ohio

Contact:

Maria Galanti

District:

Southeast District Office

Phone:

740-380-5351

Contaminants:

Ground water - TCE, DCE, VC

Review of Work Plan

Approximately 750 hybrid poplar trees were planted in 3 acres in 1999. Impacts appear to extend in the bedrock (Berea Sandstone). Operation and maintenance includes surface water and ground water monitoring. After the fifth growing season Fall 2003, the average TCE concentration from the wells will be compared to Ohio EPA preliminary performance goals to determine the efficacy of the system. If the phytoremediation does not reduce the contaminant levels to the goals, alternative remedial measures would be evaluated, to be installed in conjunction with the remedy in place.

Site:

Green II Landfill-Hocking County, Ohio

Contact: District:

Jessica Smith/Abby Lovell Southeast District Office

Phone:

740-380-5251

Contaminants:

Landfill Leachate-mainly VOCs

Review of Work Plan and telephone conversation with Abby Lovell.

Hybrid Poplar and Willow trees were planted in 1999 on 8.5 acres. In addition the landfill has a leachate collection system. Due to the drought of 1999 several trees died and were replanted. The trees were planted in an effort to reduce landfill leachate volume. Ground water monitoring will be conducted with VOC, SVOC and metals analysis.

SWDO

Site:

Center Hill Landfill-Cincinnati, Ohio

Contact:

Cheryl Allen

District:

Southwest District Office

Phone:

937-285-6357

Additional Contact: Jack Wachter-City of Cincinnati, 513-352-6992

Contaminants:

VOCs and metals

Review of Work Plan and telephone conversation with Jack Wachter.

Trees were planted on top of the landfill in late spring of 1999. Most of the trees on top of the landfill died due to the drought in the summer of 1999. In spring of 2000, U.S. EPA conducted test planting using Poplar, Cottonwood, Box Elder and Willows. The City of Cincinnati is expecting a progress report from the U.S. EPA. The trees were planted in an effort to reduce leachate volume in the leachate collection system.

Site:

RCRA Land Treatment Unit (LTU)-Cincinnati, Ohio

Contact:

Tim Staiger

District:

Southwest District Office

Phone:

937-285-6357

Additional Contact: Shawn Doherty-ERM

Contaminants:

Metals, VOCs and SVOCs

Review of Closure and Post-Closure Plan

The Land Treatment Unit (LTU) is 5.5 acres which is used to biologically treat hazardous waste and nonhazardous oil sludges generated by petroleum refining processes. Active planting using mixture of rye, fescue and clover and natural revegetation is planned to uptake metals and increase polyaromatic hydrocarbon biodegradation in-situ. Closure plan includes monitoring of ground water and unsaturated soil zones.

Appendix N Case Studies – Solidification/Stabilization of Oily Materials



Nercross, Georgia 30071

te 770-242-4090

fax 770-242-9198

www.kiber.com

18 February 1999

Mr. Michael Thede Environmental Resource Management, Inc. 355 East Campus View Suite 250 Columbus, Ohio 43235 (614) 433-7900

Subject:

Qualifications and Experience

Treatability Studies

Dear Mr. Thede:

Kiber Environmental Services, Inc. (Kiber) is pleased to present Environmental Resource Management, Inc. (ERM) with information regarding our qualifications and experience with respect to treatability testing, as well as a summary of additional services offered by Kiber. Kiber has prepared this letter as requested in a telephone conversation with Mr. Robert Semenak on 18 February 1998. Kiber's experience includes bench-scale evaluations of a broad range of treatment alternatives for use on soils, sludges, sediments and waters as well as oversight of full-scale and pilot-scale treatment. As indicated in our telephone conversation, it is Kiber's understanding that ERM is interested in stabilization / solidification treatment of oily sludge-like materials.

Kiber specializes in treatability evaluations of new and innovative technologies. Kiber's treatability department has been evaluating innovative processes for the treatment of hazardous wastes for over ten years. As a part of this expertise, Kiber is often tasked with developing testing programs designed to simulate both new and proven potential full-scale processes to the extent possible on the laboratory scale. Kiber's treatability personnel draw upon direct experience with full-scale treatment processes to ensure that laboratory evaluations accurately simulate potential full-scale operating conditions.

While Kiber specializes in performing treatability studies, note that Kiber does not market a specific or proprietary treatment process. As such, Kiber is an independent evaluator of potential treatment options. Because of this, Kiber is able to provide unbiased testing for a broad range of proprietary and non-proprietary processes. In this capacity, Kiber has developed strong working relationships with a wide range of process and reagent vendors, as well as full-scale contractors, in an effort to accurately evaluate the various technologies available.



Mr. Michael Thede Letter, Page 2

Kiber has completed over 1,500 treatability studies across the United States and internationally for private and industrial clients, PRP committees, attorneys, environmental consultants, and governmental agencies. Kiber is well known for our expertise in treatability testing using innovative technologies to treat liquid and solid hazardous waste. Our technical capabilities have provided Kiber the opportunity to be a major participant in the U.S. Environmental Protection Agency (EPA) Superfund Innovative Technology Evaluation (SITE) Program.

Kiber adheres to the requirements of RCRA for treatability testing under 40 CFR Parts 260 and 261. EPA Region IV has granted Kiber a TSCA permit allowing us to perform treatability studies on wastes contaminated with PCBs. In addition to the rigorous audits performed in support of studies for the EPA, Kiber's laboratories maintain certifications with the Army Corps of Engineers, the Air Force Center for Environmental Excellence (AFCEE), and the States of Florida, South Carolina and Tennessee.

CORPORATE OVERVIEW

Kiber is a woman-owned, small corporation based in Atlanta, Georgia. The company was founded in 1988 to provide "specialty" environmental consulting services to the hazardous waste remediation industry, including: treatability studies, analytical testing, site assessment services, and remediation/construction oversight and management. Kiber currently employs 16 individuals, 15 of which possess professional environmental qualifications in various elements of the environmental industry, from initial site characterization, to RI/FS, to evaluation of treatment alternatives, through full-scale remediation.

Since 1988, Kiber has gained an exceptional reputation with both government and private industry clients as one of the foremost treatability study laboratories in the United States. In the past, Kiber's founders and senior employees have worked either directly with EPA or under some of its regional contractors (ERCS and TAT). Furthermore, these same individuals have been involved with projects for the Corps of Engineers and the Department of Energy. Kiber's extensive experience is most often utilized in the areas of remediation management and oversight, treatability studies, and analytical and physical properties testing.

TREATABILITY STUDIES

Today, Kiber's treatability studies are known nationwide as being innovative, comprehensive, and extremely competitive. Furthermore, Kiber's treatability consultants are recognized as being the most knowledgeable in the industry. Kiber's success in performing treatability studies is attributed to the combination of talents assembled in the Atlanta facilities. The treatability department consists of remediation specialists, geotechnical and environmental engineers, environmental scientists, physical properties technicians and analytical chemists.

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Mr. Michael Thede Letter, Page 3

Treatability studies performed by Kiber often include the following:

Stabilization / Solidification / Immobilization
Sludge Dewatering
Water Treatment
Biological Treatment (aerobic and anaerobic)
Incineration
Thermal Treatment
Soil Washing / Soil Flushing
Chemical Dehalogenation / Dechlorination

Our facilities are designed not only to perform routine treatability testing, but also to simulate innovative technologies through the direction of the client and through the design capabilities of Kiber. As an independent laboratory, Kiber is able to provide impartial comparison and verification of the applicability of virtually any treatment technology.

ANALYTICAL AND GEOTECHNICAL TESTING

Kiber has an exclusive agreement with a full-service analytical laboratory capable of performing most routine EPA and state approved methodologies. This laboratory was founded to produce analytical data which can be used with confidence to determine the correct solution to environmental problems. The analytical capabilities include the following:

Priority Pollutants
TCLP Targets
Appendix IX
Volatiles
Pesticides / PCBs
Hydrocarbons
Target Compound List
Appendix IX
Semivolatiles
Metals
Herbicides

Kiber demands a high level of QA/QC within the analytical testing laboratory. Through the SITE program and through our projects with EPA Region IV, the laboratory has undergone audits by EPA's quality control contractor, S-Cubed, and EPA Laboratory Audit Personnel. On every occasion, this laboratory has received the approval to conduct laboratory analyses, as well as certification from the states of Florida, Tennessee and South Carolina. Additional approval has been granted by the Army Corps of Engineers and AFCEE to perform laboratory testing.

In support of treatability studies and remedial action involvement, Kiber has established a physical testing laboratory specifically for the physical and geotechnical evaluation of hazardous materials and wastes. This expertise in the handling of hazardous wastes sets Kiber apart from

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Mr. Michael Thede Letter, Page 4

traditional geotechnical laboratories. The physical properties testing capabilities of Kiber include the following:

Unconfined Compressive Strength
Permeability / Hydraulic Conductivity
Wet / Dry Durability
Freeze / Thaw Durability
Index Properties
Triaxial Shear
Consolidation
Compaction Testing
Chemical Compatibility

Kiber conducts all testing in accordance with protocols established by the American Society of Testing and Materials (ASTM), the EPA, the American Nuclear Society, and the Army Corps of Engineers. In general, the test methods associated with hazardous waste evaluations were developed for soil-like materials, and as such are not always applicable for waste-like materials. Kiber's personnel have the expertise and the experience necessary to develop testing programs for evaluation of hazardous and non-hazardous materials that provide our clients with reliable material characterizations.

PERSONNEL TRAINING

Kiber's professional and field personnel have undergone extensive training for site assessments, EPA protocols for field sampling and laboratory testing. These personnel have the required OSHA training for hazardous waste sites. Additionally, all relevant staff participate in medical monitoring and safety programs.

PROJECT RELATED EXPERIENCE

Kiber's background in the hazardous waste treatment and remediation industry includes considerable experience performing bench-, pilot- and full-scale projects. As indicated in a telephone conversation with Mr. Robert Semenak, ERM is interested in the stabilization / solidification of oily sludge-like materials. Note that Kiber has performed several stabilization / solidification studies on oily sludge-like materials, and has included several project summaries in Attachment A.

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Mr Michael Thede Letter, Page 5

CLOSURE

Kiber Environmental Services, Inc. appreciates the opportunity to provide Environmental Resource Management, Inc. with the enclosed information, and we look forward to working with you. Should you have any questions related to our services, or if we can be of assistance in any way, please feel free to contact either of the undersigned at (770) 242-4090.

Sincerely.

KIBER ENVIRONMENTAL SERVICES, INC.

Robert K. Semenak

Treatability Department Manager

Associate (ext. 235)

George M. Zaharchak

Project Manager

(Ext. 250)



ATTACHMENT A PROJECT RELATED EXPERIENCE

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KIBER ENVIRONMENTAL SERVICES, INC. STABILIZATION TESTING AND CONSULTING EXPERIENCE FOR S/S OF SLUDGE MATERIALS

1. Project Name:

Douglassville Superfund Site

Project Location:

Pennsylvania

Client:

Barr Engineering Company

Kiber was contracted to conduct extensive treatability and analytical testing associated with evaluation of stabilization and biological treatment for sludges from the Douglassville Disposal Site. The treatability studies were conducted in order to determine if stabilization or biological remediation are more feasible alternatives than the Record of Decision (ROD) of incineration for the site materials. Kiber's project was divided into three programs, including 1) material characterization, 2) stabilization treatability evaluations, and 3) analytical characterization.

All untreated materials were sampled by Kiber's client and shipped to Kiber's treatability facilities in Atlanta, Georgia. Upon material receipt, Kiber conducted extensive physical and chemical characterization in accordance with EPA testing protocols. Because of the high percentage of organics, especially TPH compounds that interfere with the analyses, Kiber was challenged with the task of providing accurate material characterizations while maintaining acceptable detection limits. The results of these analyses were used as the baseline contaminant levels for both treatability studies. The primary contaminants included petroleum hydrocarbons at concentrations greater than 30 percent and PCBs at concentrations in excess of 50 ppm. The waste materials were classified as TCLP hazardous for lead.

The second program included comprehensive physical and chemical analyses associated with the stabilization treatability study. Kiber outlined a treatability testing program that evaluated several proprietary and vendor processes. The objectives of the treatability study were to 1) reduce the mobility of the contaminant concentrations, 2) determine the engineering properties of the untreated and treated waste, 3) evaluate the potential volatilization during treatment, and 4) evaluate the long-term durability of the treated material at resisting degradation and leachability. The results of the treatability study identified three potential treatment processes for the remediation of the Douglassville Disposal Site.

The third program included analytical testing of samples generated in conjunction with the biological treatment study. Comprehensive analytical testing was conducted in order to 1) evaluate the effectiveness of the biological treatment, and 2) provide the information necessary to perform comparisons between biological and stabilization treatment.

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2. Project Name:

Murphy's Oil USA Refinery Site

Project Location:

Superior, Wisconsin

Client:

Burns & McDonnell Waste Consultants, Inc.

Kiber Environmental Services, Inc. was contracted by Burns & McDonnell Waste Consultants, Inc. to perform a remedy screening treatability study on sludges containing high concentrations of organic and inorganic contaminants. The generalized objectives of the treatability study were to evaluate the feasibility of stabilizing the site materials using in situ technologies. Specifically, treatment was performed to improve the physical properties of the treated sludge while reducing the leachability of the primary contaminants of concern.

Untreated characterization evaluations of the site sludges revealed 1) very high moisture content values, ranging from 60% to 80% on a total-weight basis, and 2) high leachable concentrations of benzene, toluene, ethylbenzene, xylene (BTEX), naphthalene and selenium. Treatment was performed to evaluate dewatering of the sludges and stabilization treatment using a broad range of non-proprietary reagents. Throughout the project, Kiber evaluated over 90 different combinations of reagents and addition rates. Treatment was performed for two separate approaches. Primary treatment focused on evaluating stabilization and solidification of the primary contaminants of concern. However, additional testing was also performed using a two-step treatment process to evaluate 1) volatilization of the majority of organic contaminants, and 2) stabilization and solidification of the remaining organic and inorganic contaminants.

Analyses performed on the optimum treated materials revealed that stabilization / solidification treatment of the site sludges resulted in dramatic reductions in the leachability of the primary contaminants of concern. Specifically, candidate mixtures were identified which 1) improved the physical properties of the site sludges, and 2) resulted in non-hazardous materials as determined through TCLP leachability evaluations. Full-scale stabilization of the site is currently planned based on the results of this study.

3. Project Name:

Midco I/II Superfund Sites

Project Location:

Gary, Indiana

Client:

U.S. EPA START / SAIC, Inc.

U.S. EPA ARCS / Roy F. Weston, Inc.

Kiber was contracted by the U.S. Environmental Protection Agency (EPA), through its contractor SAIC, to perform treatability and analytical testing for the Midco I and II Superfund Sites located in Gary, Indiana. The testing was performed in support of the EPA Superfund Technical Assistance Response Team (START) contract. A Consent Decree issued for the sites identifies minimum performance standards for stabilization of metals and organics. Results of Kiber's testing may lead to a revision of the performance standards in the Consent Decree, if the current standards prove to be impractical or

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unattainable. Kiber's responsibilities included: 1) receipt and storage of bulk shipments of untreated soil; and 2) analyses of SPLP leachates produced from raw and treated soils for semivolatile organic compounds, PCBs 'pesticides, metals and cyanide, and performance of treatability testing operations.

In Addition, Kiber was contracted by U.S. EPA, through its contractor Roy F. Weston, Inc., to perform geotechnical testing as part of the Midco I/II Treatability Study. The testing was performed in support of the EPA ARCS Contract. Kiber's responsibilities under this contract included compressive strength, permeability and durability testing. All testing was performed in accordance with a project-specific QAPP.

4. Project Name:

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Pab Oil Superfund Site

Project Location:

Vermillion Parish, Louisiana

Client:

RETEC / TRC Environmental Solutions, Inc.

Kiber Environmental Services, Inc. (Kiber) performed two treatability studies for the Pab Oil Superfund Site to evaluate the ability to stabilize PCB contaminated soils. After completion of the treatability studies, Kiber performed oversight during pilot-scale testing. Once results from pilot-scale testing indicated that the treated materials achieved the site performance criteria, full-scale treatment was initiated. During full-scale treatment, Kiber performed confirmation analytical and geotechnical testing of the treated materials. Additional site activities included penetrometer testing of the in place treated materials.

The untreated soils revealed total PCB concentrations of approximately 1,800 mg/kg and TCLP PCB concentrations ranging from less than 1 ug/L to 2.5 ug/L. Stabilization treatment was performed to evaluate several proprietary and non-proprietary reagents, as well as various pretreatment additives for treatment of the PCB contamination.

Kiber outlined a testing program which included comprehensive physical and chemical analyses of the treated materials. The objectives of the treatability study were to 1) reduce the mobility of PCBs, 2) determine the engineering properties of the untreated and treated wastes, and 3) evaluate the long-term ability of the treated material to resist leaching of both volatile organic and PCB compounds.

Throughout the treatability study, Kiber developed over 40 mixtures to evaluate various treatment reagents and processes. Treatment included evaluations of a wide range of reagents, additives and curing processes designed to optimize effective immobilization of the PCB contamination. Treated evaluations were performed at cure times of up to 238 days to evaluate the long term ability to minimize leachability of the contaminants of concern.

After treatability testing was complete, Kiber was contracted by TRC Environmental Solutions, Inc. to perform treated material confirmation testing and provide technical assistance during both pilot-scale and full-scale treatment at the Pab Oil site.

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5. Project Name:

Exit 13 Site

Project Location:

Concord, New Hampshire

Client:

Haley and Aldrich, Inc.

Kiber Environmental Services, Inc. was retained by Haley and Aldrich, Inc. to perform a remedy screening treatability study on pure coal tar sludges containing high concentrations of organic contaminants. The objective of the treatability study was to evaluate the feasibility of using solidification/stabilization technology for treating coal tar sludges. Specifically, treatment was performed to improve the physical properties of the treated sludge while limiting the leachability of the primary contaminants of concern.

Untreated characterization evaluations of the coal tar sludges revealed that the sludges had: 1) had high moisture content values, approximately 60% on a total-weight basis; 2) high concentrations of volatile organic compounds including benzene, toluene, ethylbenzene, and xylene (BTEX); 3) high concentrations of semivolatile compounds including acenaphthlyene, napthalene and phenanthrene; and 4) high concentrations of petroleum hydrocarbons (TPH). Throughout the project, Kiber evaluated over 30 different combinations of reagents and addition rates. Stabilization treatment was performed in several phases. The first phase involved blending a variety of non-proprietary reagents with the most heavily contaminated material in order to quickly evaluate the mixtures for physical integrity, handling properties and uniform incorporation of reagents and sludge. The second phase of treatment, Kiber selected the most favorable of these mixtures for further qualitative evaluations. Variations of mixture addition rates and reagent combinations were performed to further optimize candidate mixtures. The final phase of testing was performed to verify the effectiveness of the candidate mixtures for treatment of site coal tar sludges.

The analyses performed on the final treated materials revealed that the stabilized and solidified materials did not leach volatile or semivolatile compounds at concentrations above regulatory levels. Specifically, candidate mixtures were identified which 1) improved the physical properties of the site sludges, and 2) resulted in non-hazardous materials as determined through TCLP leachability evaluations.

6. Project Name:

McColl Superfund Site

Project Location:

California

Client:

United States Environmental Protection Agency

ICF Kaiser Engineers, Inc.

Kiber Environmental Services, Inc. (Kiber) conducted a treatability study for the U.S. Environmental Protection Agency (EPA), Office of Research and Development under the Superfund Technical Assistance Response Team contract (START), to evaluate the effectiveness of in situ solidification treatment of contaminated materials sampled from the McColl Superfund Site. The materials sampled from the Site contained high concentrations of benzene, toluene, ethylbenzene and xylenes (BTEX), as well as

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thiophene sulfates, and other sulfur-containing organic compounds. Several of the materials were extremely acidic (pH<1) and had high organic and sulfur contents of greater than 70 percent and 10 percent, respectively.

Kiber developed a testing program designed to determine the effectiveness of solidification treatment, using both proprietary and non-proprietary reagents at achieving the treatment objectives for the site. As such, Kiber developed over 150 mixtures in order to screen the effectiveness of 15 reagents.

Kiber performed comprehensive volatilization monitoring and mixture development on six mixtures identified as being the most effective at treating the site materials. Further analyses included 1) mixture development using enclosed glovebag chambers to quantitatively monitor volatilization during the treatment process, 2) chemical characterization of the treated materials, emissions occurring from the treated materials for cure times, and 3) the evaluation of oxidation reagents for treatment of the thiophene contamination.

Kiber was able to demonstrate and validate, through the treatability testing program, that solidification treatment was effective for remediation of the site and recommend the treatment process. Kiber was ultimately contracted by ICF Kaiser Engineers Inc. in support of U.S. EPA Region IX ARCS, to provide technical oversite for the pilot demonstration.

7. Project Name:

Model City, New York Facility

Project Location:

Model City, New York

Client:

CWM Chemical Services, Inc.

Kiber was contracted to conduct extensive treatability and analytical testing associated with evaluation of stabilization and solidification (S/S) treatment for salt and lagoon sludges from the Chemical Waste Management facility (the site) located in Model City, New York. The primary objectives of the treatability study included 1) identifying candidate mixtures for treatment of the sludges through qualitative evaluations of emissions, temperature, volumetric expansion, and leachability of contaminants, 2) eliminating the presence of free liquids to ensure compliance with landfill restrictions, 3) evaluating the ability of the material to support construction of a cover system by exhibiting a unconfined compressive strength greater than 25 pounds per square inch (lbs/in²), and 4) determining reductions in total and toxicity characteristic leaching procedure (TCLP) concentrations of volatiles, semivolatiles, PCBs and metals in the sludges as a result of the S/S treatment

Kiber conducted extensive physical and chemical characterization in accordance with EPA testing protocols. The lagoon sludge was more highly contaminated than the salt site materials. The lagoon sludge exhibited total volatile concentrations of tetrachloroethene, toluene, trichloroethene and xylene ranged from 940,000 to 22,110,000

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ug/kg. TCLP volatile concentrations of the lagoon site material for tetrachloroethene, toluene, trichloroethene and xylene were found to be 54,000, 3,200, 19,000 and 6,100 ug/L, respectively. Total and TCLP semivolatile concentrations were significantly high as well. The lagoon sludge exhibited total and TCLP PCB concentrations for Aroclor-1242 of 13,000,000 ug/kg and 420 ug/L, and Aroclor-1260 concentrations of 8,200,000 ug/kg and 210 ug/L, respectively. The lagoon sample was highly contaminated with chromium and lead at concentrations of 2,200 and 1,400 mg/kg, respectively. Since the untreated material contained such high concentrations of contaminates, Kiber was tasked with providing an accurate material characterization while maintaining acceptable detection limits. The results of these analyses were used as the baseline contaminant levels for the treatability study. Both the salts and lagoon waste materials were classified as highly hazardous for total and TCLP organics and metals concentrations.

S/S treatment included comprehensive physical and chemical analyses associated with the immobilization treatability study. The salt untreated materials were successfully treated with the addition of a cement slurry. The successfully treated salt materials were capable of achieving the site strength criteria and reducing concentrations of total and leachable organics, and leachable metals.

Kiber outlined a treatability testing program that evaluated several proprietary and vendor processes for treating the highly contaminated lagoon waste material. The results of the treatability study identified two optimum treatment processes for the remediation of the site. The lagoon material was first neutralized with addition of a lime slurry, and then subjected to both ambient and hot-air stripping.

Neutralization with the addition of a lime slurry was successful in both reducing the acidity of the waste as well as reducing total volatile and semivolatile organic concentrations. Semivolatile and volatile organic concentrations were reduced when the lime slurry reacted with the acidic lagoon material and an exothermic acid-base reaction occurred. The exothermic reaction produced sufficient heat to volatilize a significant concentration of both volatile and semivolatile organics. Air stripping was necessary to further lower total and leachable volatiles and semivolatiles organic concentrations.

Kiber performed two air stripping treatment processes that promoted volatilization on the neutralized lagoon material, including, 1) blending of neutralized material with ambient air injection, and 2) blending of neutralized lagoon material with hot air injection at approximately 100°C. During both air stripping treatments, temperature and organic emissions were monitored for an extended period of time. Both the ambient air stripped and hot air stripped lagoon materials exhibited significant reductions of volatile and semivolatile organic compounds. However, the hot air stripped material exhibited slightly higher reductions than did the ambient air stripped material. To achieve site strength and leachability criteria stabilization of the lagoon material was necessary.

Tasked with determining the most cost-effective approach to obtaining site treatment criteria of the highly contaminated lagoon material, Kiber developed several S/S

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mixtures. Stabilization of the neutralized/ambient air stripped material with the addition of a cement slurry proved to be the most cost-effective way to improve setting and strength properties, and to reduce concentrations of leachable metals and PCBs.

8. Project Name:

Stockton Manufactured Gas Plant

Project Location:

Stockton, California

Client:

CH2M HILL

Millgard Environmental Corporation

Kiber Environmental Services, Inc. (Kiber) was contracted to perform a remedy screening treatability study on contaminated materials sampled from a former manufactured gas plant (MGP) site located in Stockton, California. The treatability study was conducted for Millgard Environmental Corporation (an in situ solidification contractor) and CH2M HILL, on behalf of the Pacific Gas and Electric Company, to evaluate the feasibility of in situ solidification / stabilization for treatment of sludges sampled from the site. The primary objective of the treatability study was to identify the most cost effective solidification / stabilization treatment which achieved the site performance specifications. The candidate treatment process must 1) achieve leaching and permeability requirements, 2) produce sufficient compressive strength to support equipment during construction operations and to support a protective cap placed after remediation, 3) have a low implementation cost, and 4) minimize volume swell and maximize bulk density in order to minimize change in grade or off-site disposal requirements.

Solidification / stabilization treatment involved developing mixtures to evaluate a broad range of proprietary and non-proprietary reagents. The blending process was a cost-effective process intended to mimic full-scale processes to the extent possible on the laboratory scale. Throughout the treatment program, extensive interaction with Millgard ensured that the treatment processes evaluated were implementable, practical and cost-effective for full-scale treatment. Preliminary treatment evaluations included strength monitoring and volumetric expansion determinations. Analytical characterization was also performed on candidate mixtures to verify that the treatment process was minimizing contaminant leachability.

Based on the results of preliminary treatment, several candidate mixtures were identified for comprehensive treated evaluations, including diffusivity and leachability evaluations, as well as unconfined compressive strength and permeability analyses. The results of the final evaluations performed on the the candidate treated materials indicated that stabilization treatment was capable of achieving site-specific performance criteria.

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9. Project Name:

Harbor Point

Project Location:

State of New York

Client:

Parsons Engineering Science

Kiber Environmental Services, Inc. (Kiber) was contracted to perform a remedy screening treatability study on contaminated materials sampled from a harbor bordering a manufactured gas plant (MGP) site located in the State of New York. The treatability study was conducted for Parsons Engineering Science (Parsons ES) to identify 1) the chemical and physical properties of the untreated sediment, 2) the volume reduction achievable through removal of free water from the sediment using dewatering processes, and 3) stabilization reagents capable of reducing the leachability of contaminants and improving the geotechnical properties of the treated sediment.

Dewatering treatment involved the evaluation of three separate treatment options to determine the most effective method of dewatering the untreated sediment. The treatment technologies evaluated included laboratory evaluations of several full-scale technologies, including gravity drainage, belt filter press, plate filter press, and recessed plate filter presses. Treatment was performed on the laboratory scale to provide an initial screening of the treatment effectiveness while mimicking potential full-scale dewatering procedures to the extent possible in the laboratory.

Stabilization treatment involved developing mixtures to evaluate a broad range of proprietary and non-proprietary reagents. The blending process was a cost-effective process intended to mimic full-scale processes to the extent possible on the laboratory scale. Treated evaluations for TCLP volatiles and semivolatiles as well as unconfined compressive strength were performed after 7 days of curing to evaluate the potential to successfully immobilize the contaminants while improving the physical handling characteristics.

The results of the treatability study indicate that both technologies tested are effective at achieving the respective treatment objectives. Dewatering provided significant volume reduction in the untreated sediment. Stabilization treatment was successful at reducing leachable concentrations of volatile and semivolatile organics and at improving the physical properties of the untreated sediment. Full-scale treatment is currently on-going at the site based on the results obtained through treatability testing.

10. Project Name:

Tilghman Street

Project Location:

Philadelphia, Pennsylvania

Client:

Marcor of Pennsylvania, Inc.

Marcor of Pennsylvania contracted Kiber to perform a treatability study to evaluate stabilization treatment of sludge from the tar separators at the Tilghman Street Manufactured Gas Plant (MGP) site. The objective of the treatability study was to determine if treatment using reagents supplied by International Waste Technologies, Inc.

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were effective in reducing concentrations of contaminants below the Toxicity Characteristic Leaching Procedure (TCLP) regulatory limits. In addition, other analytical performance criteria for the sludge included total polychlorinated biphenyls (PCBs), reactive cyanide, reactive sulfide, total halogenated organics (TOX), and total petroleum hydrocarbons (TPH). The physical properties of the sludge required improvement also as a part of the performance specifications. Specifically, the sludge had to pass the paint filter test.

Two phases of treatment evaluations were conducted with the IWT reagents. The preliminary phase was used to screen various reagents and reagent concentrations. Based on the results of this phase, a final mixture was evaluated for complete TCLP toxicity characteristics. The results of the treatability study indicated that the treatment process achieved all of the performance specifications.

11. Project Name:

MGP - Halliburton Project

Project Location:

Columbus, Georgia

Client:

Geo-Con, Inc.

Kiber was retained by Geo-Con, Inc. to conduct a stabilization treatability study on sludge from a manufactured gas plant (MGP) located in Columbus, Georgia. The objective of the treatability study was to verify the effectiveness of the process for 1) improving the physical properties and material handling characteristics of the sludge and 2) reducing the leaching of polycyclic aromatic hydrocarbons (PAHs) to below the Toxicity Characteristic Leaching Procedure (TCLP) regulatory limits. The study successfully exhibited that Type I Portland cement was effective for treatment of the sludge. Physical properties and material handling characteristics were improved and the 28 day cure leaching of PAHs was reduced to below regulatory limits. Geo-Con performed successful full-scale implementation of the treatability study at the site.

12. Project Name:

Southern Shipbuilding

Project Location:

Louisiana

Client:

US EPA Office of Research and Development

START Program

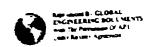
Kiber conducted a treatability study on tarry sludge produced by barge cleaning operations at the Southern Shipbuilding Corporation Site in Louisiana. The principal contaminants of concern consisted of semivolatile organic compounds (SVOCs) at concentrations between 100 and 10,000 mg/kg. The primary objectives of the treatability study included 1) identifying candidate mixtures for treatment of the sludge through qualitative evaluations of emissions, temperature, volumetric expansion, and leachability of contaminants, 2) eliminating the presence of free liquids to ensure compliance with landfill restrictions, 3) evaluating the ability of the material to support a protective cap by exhibiting a unconfined compressive strength greater than 50 pounds per square inch

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(lbs/in²), and 4) determining reductions in total and leachable SVOC concentrations in the sludge as a result of the treatments.

Both proprietary and non-proprietary reagents were evaluated for treatment of the sludge including Type I Portland cement, hydrated lime, powdered activated carbon, organophillic clay, natural zeolite clay, reagents from International Waste Technologies, Inc., and Rheox, Inc. The treatments reduced the leachability of phenol and methyl-substituted compounds, but did not significantly reduce the leachability of polycyclic aromatic hydrocarbons. Free liquids were eliminated in virtually all of the treated materials. Unconfined compressive strengths of greater than 125 lbs/in² were achieved for the treated materials.

The results of the treatability study indicated that solidification/stabilization was an adequate remedy for preventing movement of the waste into the adjacent bayou and that unconfined compressive strengths were sufficient to support a potential cap at the site.



EVALUATION OF TREATMENT TECHNOLOGIES FOR LISTED PETROLEUM REFINERY WASTES

API PUBLICATION NO. 4465 HEALTH AND ENVIRONMENTAL SCIENCES DEPARTMENT MAY 1988

> American Petroleum Institute 1220 L Street, Northwest Washington, D.C. 20005

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CHAPTER 6. FIXATION

INTRODUCTION

Fixation processes generally involve the treatment of wastes with cement, silicates and/or lime-based materials to form a solid or semisolid product. The processes are well proven for sludges containing heavy metals, such as electroplating (F006) sludges. These processes have been called stabilization, solidification, or encapsulation. The term "fixation" will be used here for simplicity.

OVERVIEW

Unlike all of the other classes of treatment included in this project, fixation does not remove any of the hazardous materials present in a waste, does not recover any oil that can be reclaimed/recycled into the refinery operation, and does not reduce the volume of waste to be disposed. Rather, fixation changes the physical, and sometimes chemical, characteristics of the waste to reduce leachability. Volume and weight of material requiring disposal typically increases anywhere from 10% to 100%.

Fixation Process Number 1, which claims to be effective in encapsulating/fixing a hazardous wastes containing organics as well as inorganics, shows effectiveness in reducing leachability of the volatile organics. As seen in Tables 6-1, 6-2 and 6-3, except for one reduction of 65%, the reduction in volatile organics in the TCLP leachate was 92-99%. It is uncertain whether the volatiles are actually fixed or lost during fixation.

Effectiveness for other organics and the metals is inconsistent.

The data for Process Number 2 and Process Number 3 are inconsistent and insufficient to allow drawing strong conclusions.

Fixation technologies continue to change and develop and should be considered a tool for use when effectiveness can be demonstrated in meeting required performance standards.

DISCUSSION--PROCESS DESCRIPTION AND OPERATION

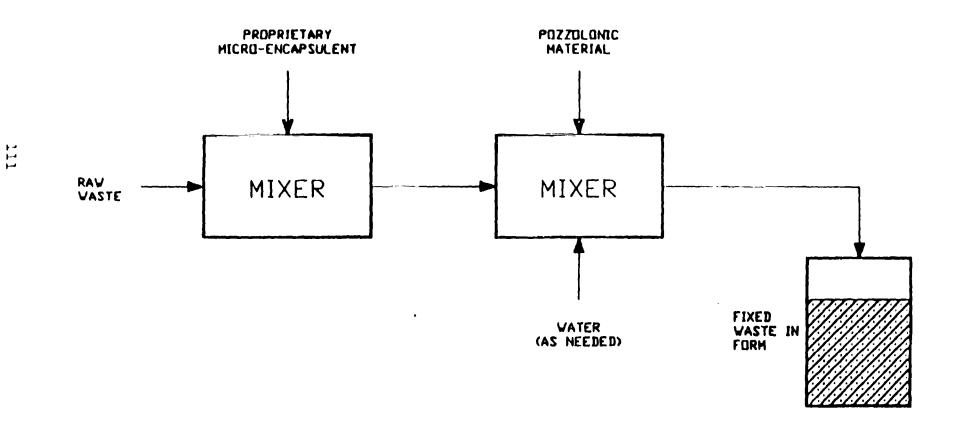
Fixation Process Number 1

<u>Applicability</u>: This fixation process has potential applicability for stabilizing both the organic and inorganic components of raw petroleum refinery wastes.

Underlying principles of operation: A schematic diagram is shown in Figure 6-1. The first step involves the addition of a proprietary chemical (PC) to disperse and microencapsulate the hydrocarbons in the sludge. The organics are claimed to be surrounded by the PC and entrapped. The second step involves the addition of cementitious material (e.g. fly ash, cement, and kiln dust) to fix and solidify the entire waste. Reportedly, fly ash works best with petroleum refinery wastes. The resultant hardened mass can attain high compressive strengths of 1,000 to 5,000 psi, and can have permeabilities of 10^{-2} to 10^{-9} cm/sec. This process can be applied over a temperature range of $-20^{\circ}F$ to $200^{\circ}F$.

Fixation Process Number 2

Applicability: This process is one of the oldest fixation processes available commercially. It has been used to treat liquids and solids from a wide variety of industries including primary metals, metal finishing, chemical, petrochemical, and automotive. The process has gained considerable acceptance for fixation of municipal sewage and industrial wastewater treatment plant sludges.



Underlying Principles of Operation: Water soluble silicates are reacted with complex cations in the presence of a silicone setting agent. The proprietor claims at least two general types of reactions occur.

- (1) Amorphous, colloidal silicates precipitate. These silicates are extremely complex and the chemical formulae will vary depending at least upon: pH, availability and concentrations of cations, and temperature. All three parameters vary during the process resulting in a variety of silicates being formed. Silicate ions have the form of double, trigonal and tetragonal rings of the $(Si_6O_{15})^{-6}$, $(Si_8O_{20})^{-8}$, and $(Si_8O_{18}(OH)_2)^{-6}$ compositions.
- (2) SiO₂ acts as a precipitating agent. The metallic precipitates are generally trapped within the physical structure developed during the formation of the amorphous colloids. The encapsulation of the particles tends to make them impermeable to water.

Fixation Process Number 3

Applicability: This fixation process is a demonstrated technology which claims the capability of reducing the leachability of a wide variety of hazardous industrial sludge wastes. The process has been in commercial use since 1974. This process is generally applied to inorganic sludges with a water content between 20 to 75% and an oil content of less than 10%.

Underlying principles of operation: In this process, hazardous waste sludges are treated with a mixture of cement, fly ash and lime. The proportions of the three reagents and the weight ratios of waste to total reagent are adjusted for each waste to achieve desired setting times, compressive strength and leachability of the final formulation.

Cement is typically prepared by heating a mixture of calcium carbonate and aluminum silicate in a kiln at high temperature to form a complex calcium-aluminum silicate. In the presence of water, the cement particles hydrate with the formation of a gel, and the growth of silica fibrils. As the particles swell and the fibrils interlock, a rigid solid mass is formed.

Adjustment of the ratios of calcium oxide (lime) and aluminum silicate, added in the form of fly ash, in the reaction mixture with water can impart improved properties to the final product. Lime additions aid in the precipitation of heavy metals as their hydroxides. These become entrapped in the cement matrix as it solidifies, with resultant reduced leachability.

The physical-chemical mechanisms which lead to waste fixation in cement-lime-fly ash systems are not easily determined. For each waste, therefore, the appropriate reagent mix must generally be established in bench scale tests, using the leachate characteristics of the end product as a measure of treatment effectiveness.

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TEST PROCEDURES, RESULTS AND DISCUSSION

The following methods of data correlation and presentation are used to evaluate the effectiveness of fixation in reducing environmental hazards. The concentration of either an array of Appendix VIII compounds or a limited number of screening compounds in the TCLP leachate from the feed and from the fixed product are given, and the "Percent Reduction, Leachate Analysis" calculated.

Percent Reduction, Leachate Analysis of Naphthalene in Table
6-1 =

= 98.4 % = 98%

Fixation process number 1: This treatment process was tested on API separator sludge, slop oil emulsion solids, plate filter cake from refinery Bl, and belt filter cake from refinery Cl.

To determine the optimum treatment for each waste, 50-g waste samples were mixed with different amounts of proprietary chemical (PC). These tests were conducted in 8-oz plastic cups. Proprietary chemical was first added to the waste in a 1:20 ratio by weight.

Depending on the consistency of the initial mixture of waste and proprietary chemical, a 1:30 or a 1:10 mixture was prepared. The 1:20 sample mixture or the one with the best consistency was then mixed with different cementitious materials. Ratios of waste/PC mixture to cementitious material are typically 1:1, 2:1, and 3:1. The sludge consistency dictates whether these selected ratios need further modification.

An an example, the test procedure for the filter cake from refinery Bl was as follows. A 50 g sample was placed in a plastic cup. Proprietary chemical was added at a 20:1 waste to proprietary chemical ratio. After a few minutes of mixing, a 1:1 ratio of kiln dust was added. Since the resultant blend was too dry, a second ratio was prepared. A 100 g sample was placed in a plastic cup and set on the balance. Liquid proprietary chemical, 5 g (20:1) was added to the sludge, and mixed well. A 2:1 ratio (50 g) of kiln dust was added to the mixture. As the kiln dust i

mixed, more can be added to create the desired consistency. The sample was cured for 24 hours then tested for pH and compressive strength, and immersed in water to test the sample's integrity.

Test results are shown in Tables 6-1 and 6-2 for raw waste feeds, and in Tables 6-3 and 6-4 for plate and belt filter cake feeds, respectively.

It should be noted that the sample bottles with fixed raw feeds and fixed filter cakes were broken at the vendor's facilities by the vendor after being witnessed and sealed by an API task force member. This was prior to analysis being conducted by RMAL. The integrity of the samples can therefore not be guaranteed.

<u>Pixation Process Number 2</u>: This commercial fixation process is a continuous flow-through treatment system, but a batch/bench-scale test was used for the API study. In the process a series of chemical reactions takes place which involve the use of soluble sodium silicate and cementitious materials. The oxygen atoms in the silica tetrahedron bind salts and metals into the lattice work. It is claimed that organics are also trapped. The silicates give a high cation exchange capacity (CEC), which can trap polyvalent metal ions to produce stable and insoluble compounds. The exact ratios of the additives is predetermined by an independent laboratory and depends on the type and concentration of contaminants contained in the sludge.

Fixed waste is a soil-like material with an unconfined compressive strength that ranges from 2,000 to 10,000 pounds/square foot, and permeabilities from 1.0×10^{-6} to 1.0×10^{-7} cm/sec. It is resistant to erosion and is good for use as slope stability material; levees, berms, tank farm support material; landfill cover; and backfill material. Volume increase is claimed to be about 10%.

TABLE 6-1

TCLP Leachate Concentrations of API Separator Sludge and Residue from Fixation Process #1 - Refinery A

•	TCLP Levels, mg/L		\$ Reduct	
Parameter	API Separator Sludge	Fixed Residue**	Leachate Analysis***	
Lab. I.D.	62421-01	62607-02		
Volatile Organics				
Benzene	22	0.04	>99	
Methyl ethyl ketone	BDL (30)	BDL (0.15)		
Styrene	BDL (3)	0.02		
Ethylbenzene	8	0.11	99	
Toluene	28	0.24	99	
Xylene, m	17	0.25	99	
Xylenes, o & p	16	0.32	98	
Base/Neutral Organics	_			
Anthracene	3.6	BDL (0.005)	>99	
Benzo(a)anthracene	0.49	BDL (0.005)	>98	
Benzo(b)fluoranthene	BDL (0.07)	BDL (0.005)		
Benzo(a)pyrene	0.38	BDL (0.005)	>98	
Bis(2-ethylhexyl)phthalate	BDL (0.08)	BDL (0.005)		
Chrysene	0.99	BDL (0.005)	>99	
Dibenz(a,h)anthracene	BDL (0.07)	BDL (0.005)		
7,12-Dimethylbenz(a)				
anthracene	BDL (0.07)	BDL (0.005)		
Fluoranthene	BDL (0.07)	BDL (0.005)		
Indene	1.6	0.01	99;	
1-Methylnaphthalene	18	0.13	99	
Naphthalene	10.2	0.16	98	
Phenanthrene	0.005-<0.06*	0.01		
Pyrene	1.2	BDL (0.005)	>99	
Acid Organics				
o-Cresol	0.25	0.01	96	
p & m-Cresol	0.8	0.01	99	
2,4-Dimethylphenol	0.25	0.01	96	
Phenol	2.4	0.03	98	
Metals				
Arsenic	0.01	ND (0.002)	>79	
Barium	1.3	1.9	((46))	
Cadmium	ND (0.02)	ND (0.02)		
Chromium	0.89	ND (0.025)	>97	
Lead	0.29-<0.069*	ND (0.1)		
Mercury -	ND (0.001)	ND (0.001)		
Selenium	ND (0.045)	ND (0.02)		
Silver	ND (0.008)	ND (0.015)		

BDL: Below detection limit.
Detection limit in parentheses.

ND: Not detected.
Percent increase in double parentheses.

* Sample had separate oil phase; component was detected only one phase.

*** % Reduction, Leachate Analysis; See text for calculation.

^{**} Sample bottle of fixed raw feed was broken by the vendor after being witnessed and sealed by API task force member. This was done prior to analysis by RMAL. Results can, therefore, not be guaranteed.

TABLE 6-2 TCLP Leachate Concentrations of Slop Oil Emulsion Solids and Residue from Fixation Process #1 - Refinery A

<u>Parameter</u>	Slop Oil Elmulsion Solids	Fixed Residue	Reduction Leachate Analysis ²³
Lab. I.D.	62421-02	62607-01	
Wolatile Organics Benzene Methyl ethyl ketone Styrene Ethylbenzene Toluene Xylene, m Xylenes, o & p	26 BDL (70) BDL (7) 27 51 50	0.16 BOL (0.35) 0.06 0.13 0.66 0.29 0.34	99 99 99 99 98
Base/Neutral Organics Anthracene Benzo(a)anthracene Benzo(b)fluoranthene Benzo(a)pyrene Bis(2-ethylhexyl)phthalate Chrysene Dibenz(a,h)anthracene 7,12-Dimethylbenz(a) anthracene Fluoranthene Indene 1-Methylnaphthalene Naphthalene Phenanthrene Pyrene	BDL (0.003) BDL (0.003) BDL (0.003) BDL (0.003) BDL (0.003) BDL (0.003) BDL (0.003) BDL (0.003) BDL (0.003) 0.05 0.13 0.27 0.01 BDL (0.003)	BDL (0.005) BDL (0.005) BDL (0.005) BDL (0.005) BDL (0.005) BDL (0.005) BDL (0.005) BDL (0.005) BDL (0.005) 0.16 0.13 0.22 0.01 BDL (0.005)	((220)) 0 19 0
Acid Organics o-Cresol p & m-Cresol 2,4-Dimethylphenol Phenol Metals Arsenic Barium Cadmium Chromium Lead Mercury	0.05 0.01 0.06 0.02 ND (0.004) 1.4 ND (0.008) ND (0.01) ND (0.04) ND (0.001)	0.07 0.32 0.07 0.94 0.01 1.4 ND (0.02) ND (0.025) ND (0.01)	((140)) ((3100)) ((17)) ((4600))
Selenium Silver	ND (0.04) ND (0.006)	ND (0.02) ND (0.015)	

BCL : Below detection limit. Detection limit in parentheses. Percent increase in double parentheses.

 $[\]mathtt{ND}$: Not detected.

^{*} Sample bottle of fixed raw feed was broken by the vendor after being witnessed and sealed by API task force member. This was done prior to analysis by RMAL. Results can, therefore, not be guaranteed. ** 1 Reduction, Leachate Analysis; See text for calculation.

TABLE 6-3

TCLP Leachate Concentrations of Plate Filter Cake and Residue from Fixation Process #1 - Refinery B1

	TCLP Levels, mg/L		% Reduction,	
Parameter	Plate Cake	Fixed Residue#	Leachate Analysis****	
Lab. I.D.	62291-06**	62607-03***		
Volatile Organics			00	
Benzene	0.8	0.007	99	
Methyl ethyl ketone	BDL (1.2)			
Styrene	BDL (0.12)	•		
Ethylbenzene	0.22	0.00	96	
Toluene	2.2	0.09	90	
Xylene, m Xylenes, o & p	0.69 0.73	0.47	67	
•	54, 5		·	
Base/Neutral Organics Anthracene	BDL (0.002)	ND (0.002)		
Benzo(a)anthracene	BDL (0.002)	ND (0.002)		
Benzo(b)fluoranthene	BDL (0.002)			
Benzo(a)pyrene	BDL (0.002)			
Bis(2-ethylhexyl)phthalate	BDL (0.002)			
Chrysene	BDL (0.002)	ND (0.004)		
Dibenz(a,h)anthracene	BDL (0.002)	(0,001)		
7,12-Dimethylbenz(a)	202 (0:002)			
anthracene	BDL (0.002)			
Fluoranthene	BDL (0.002)			
Indene	0.02			
1-Methylnaphthalene	0.13			
Naphthalene	0.16	0.22	((38))	
Phenanthrene	0.004	ND (0.001)	>74	
Pyrene	BDL (0.002)	•		
Acid Organics				
o-Cresol	0.02			
p & m-Cresol	0.03			
2,4-Dimethylphenol	0.01			
Phenol	0.1	ND (0.12)		
Metals				
Arsenic	0.004	ND (0.002)	>49	
Barium	0.57	2.0	((251))	
Cadmium	ND (0.02)	(S0.0) DN		
Chromium	ND (0.025)	ND (0.025)		
Lead	ND (0.1)	ND (0.1)		
Mercury	ND (0.001)	ND (0.001)		
Selenium	ND (0.004)	ND (0.02)		
Silver	ND (0.015)	ND (0.015)		

BDL: Below detection limit.
Detection limit in parentheses.

ND: Not detected.
Percent increase in double parentheses.

^{*} Sample bottle of fixed raw feed was broken by the vendor after being witnessed and sealed by API task force member. This was done prior to analysis by RMAL. Results can, therefore, not be guaranteed.

^{**} Total TCLP characterization.

^{***} Indicator TCLP: It measures total xylenes and total phenols (sum of Phenol, cresols, and 2,4-dimethylphenol).

^{**** %} Reduction Leachate Analysis; See text for calculation.

TABLE 6-4

TCLP Leachate Concentrations of Belt Filter Cake and Residue from Process #1 - Refinery C1

	TCLP Levels	, mg/L#	<pre>\$ Reduction</pre>
Parameter	Belt Filter Cake	Fixed Residue**	Leachate Analysis***
Lab. I.D.	62409-10	62671-02	
Volatile Organics	·		•
Benzene	1.5	0.003	>99
Toluene	2.5	0.01	>99
Xylenes	1.8	0.14	92
PNAs and Phenols			
Anthracene	ND (0.0004)	ND (0.002))
Chrysene	ND (0.002)	ND (0.0001)
Naphthalene	0.1	ND (0.0001	1) >99
Phenanthrene	ND (0.01)	0.01	
Phenols	ND (2)	ND (0.065)	
Metals			
Arsenic	ND (0.1)	ND (0.002)	
Barium	1.0	2.2	((120))
Cadmium	ND (0.02)	ND (0.04)	
Chromium	ND (0.025)	ND (0.05)	
Lead	ND (0.1)	ND (0.2)	
Mercury	NA	ND (0.001))
Selenium	ND (0.3)	ND (0.004))
Silver	ND (0.02)	ND (0.03)	

ND: Not detected. NA: Not analyzed.

Detection limit in parentheses.

Percent increase in double parentheses.

* Indicator TCLP measures total xylenes and total phenols (sum of phenol, cresols, and 2,4-dimethylphenol). Total characterization for metals.

*** \$ Reduction, Leachate Analysis; See text for calculation.

^{**} Sample bottle of fixed raw feed was broken by the vendor after being witnessed and sealed by API task force member. This was done prior to analysis by RMAL. Results can, therefore, not be guaranteed.

Normal fixation takes four to twelve hours after processing. For API waste sludge, 12 to 24 hours are required for fixation. A total of 72 hours is suggested.

For the initial screening, a waste characterization program is conducted. Once the material is determined to be compatible with the process, chemical reactions are designed for each waste material to produce a chemically stable product. The percent oil, solids, and organics; the water requirement; and the volume increase are determined. After the sample was fixed it was tested for TCLP leachate, metals, and organics.

Some pretreatment may be required for refinery sludges. A sample may not harden if too much oil is present. If a sample does not harden after the fixation, it may first need to be filtered. A sample that contains between 10 to 20% oil can be treated; 5% is preferred.

Waste sludge must be agitated and mixed into a fine slurry. The soluble sodium silicate needs to be in contact with as much of the waste as possible to ensure proper treatment; the better the mix, the better the results. The typical test procedure for a sample of API separator sludge is as follows. Samples are first diluted with water to 30% solids content and homogenized with a blender; Portland cement was added at 22% by weight, homogenized and mixed for a couple of minutes. Liquid (soluble) sodium silicate was added at a 5% by weight ratio and mixed. The mixture was poured into jars and sealed 30 minutes later in the presence of an API member. After 24 hours the hardness is tested with a penetrometer. The penetrometer gives a preliminary indication of the hardness of the material in pounds per square foot.

Test results for Process Number 2 are shown in Tables 6-5 and 6-6 for fixed belt and plate filter cakes and in Tables 6-7 and 6-8 for thermally dried filter cakes from refineries Cl and Bl. TCLP leachate concentrations from the feed material were so close

TABLE 6-5

Indicator TCLP Leachate Concentrations of Plate Filter Cake and Residue from Process #2 - Refinery B1

	TCLP Levels, mg/L*		Reduction,
Parameter	Plate Filter Cake	Fixed Residue	Leachate Analysis**
Lab. I.D.	62291-06	62657-06	
Volatile Organics			
Benzene	0.80	0.79	1
Toluene	2.2	3.1	((41))
Xylenes	1.42	2.1	((48))
PNAs and Phenols			
Anthracene	BDL (0.002)	ND (0.0002)	•
Chrysene	BDL (0.002)	ND (0.0001)	
Naphthalene	0.16	0.17	((6))
Phenanthrene	0.004	ND (0.01)	((150))
Phenols	0.156	ND (0.1)	>35
Metals			
Arsenic	0.004	0.003	25
Barium	0.57	ND (0.5)	>12
Cadmium	ND (0.02)	ND (0.02)	
Chromium	ND (0.025)	ND (0.025)	
Lead	ND (0.1)	ND (0.1)	
Mercury	ND (0.001)	ND (0.001)	
Selenium	ND (0.004)	ND (1.5)	
Silver	ND (0.015)	ND (0.015)	

BDL : Below detection limit.

ND : Not detected.

.....

Detection limit in parentheses.

Percent increase in double parentheses.

^{*} Indicator TCLP measures total xylenes and total phenols (sum of phenol, cresols, and 2,4-dimethylphenol).

^{** \$} Reduction, Leachate Analysis; See text for calculation.

Indicator TCLP Leachate Concentrations of Belt Filter Cake and Residue from Process #2 - Refinery C1

TABLE 6-6

Parameter	TCLP Levels, Belt Filter Cake**	Fixed Residue*	Reduction Leachate Analysis***
Lab. I.D.	62409-10	62657-08	
Volatile Organics Benzene Toluene Xylenes	1.1 1.8 1.82	0.48 1.8 1.2	56 0 34
PNAs and Phenols Anthracene Chrysene Naphthalene Phenanthrene Phenols	BDL (0.01) BDL (0.01) 0.15 BDL (0.01) 0.072	ND (0.0002) ND (0.003) 0.18 ND (0.01) ND (0.16)	((20))
Metals Arsenic Barium Cadmium Chromium Cobalt Lead Mercury Selenium Silver	ND (0.1) 1.07 ND (0.02) ND (0.025) ND (0.02) ND (0.1) NA ND (0.3) ND (0.02)	0.007 ND (0.5) ND (0.02) ND (0.025) ND (0.015) ND (0.1) ND (0.001) ND (1.5) ND (0.015)	>53

BDL : Below detection limit.

ND : Not detected. NA : Not analyzed.

Detection limit in parentheses.

Percent increase in double parentheses.

^{*} Indicator TCLP measures total xylenes and total phenols (sum of phenol, cresols, and 2,4-dimethylphenol). Total characterization for metals.

^{**} Total TCLP characterization.

^{*** %} Reduction, Leachate Analysis; See text for calculation.

TABLE 6-7

Indicator TCLP Leachate Concentrations of Thermally Treated Plate Filter Cake and Residue from Fixation Process # 2 - Refinery B1

	TCLP Levels, mg/L=		Reduction
Parameter	Thermally Treated Plate Filter Cake	Fixed Residue	Leachate Analysis**
Lab. I.D.	62583-04	62657-02	
Volatile Organics			
Benzene	0.012	0.003	75
Toluene	0.034	0.01	71
Xylenes	0.039	0.02	. 49
PMAs and Phenols			
Anthracene	ND (0.001)	ND (0.0002	2)
Chrysene	ND (0.005)	ND (0.001)	
Naphthalene	ND (0.020)	ND (0.002)	
Phenanthrene	ND (0.006)	ND (0.01)	
Phenols	ND (1.3)	ND (1.3)	
Metals			
Arsenic	ND (0.1)	ND (0.002)	
Barium	1.3	0.5	62
Cadmium	0.02	ND (0.02)	
Chromium	ND (0.025)	ND (0.025)	
Lead	ND (0.1)	ND (0.1)	
Mercury	NA	ND (0.001)	
Selenium	ND (0.3)	ND (1.5)	
Silver	ND (0.02)	ND (0.015)	

BDL : Below detection limit.

ND : Not detected. NA : Not analyzed

Detection limit in parentheses.

* Indicator TCLP measures total xylenes and total phenols (sum of phenol, cresols, and 2,4-dimethylphenol).

** % Reduction, Leachate Analysis; See text for calculation.

Indicator TCLP Leachate Concentrations of Thermally Treated Belt Filter Cake and Residue from Fixation Process #2 - Refinery C1

TABLE 6-8

	TCLP Levels, mg/L*		% Reducti
Parameter	Thermally Treated Belt Filter Cake	Fixed Residue	Leachate Analysis
Lab. I.D.	62583-31	62657-04	
Volatile Organics			
Benzene	0.002	0.005	((150))
Toluene	0.020	0.01	50
Xylenes	0.003	0.02	((566))
PNAs and Phenols			
Anthracene	ND (0.003)	ND (0.002)	
Chrysene	ND (0.10)	ND (0.01)	
Naphthalene	0.17	ND (0.15)	>11
Phenanthrene	0.050	ND (0.1)	
Phenols	ND (0.94)	ND (3.1)	
Metals			
Arsenic	ND (0.04)	0.016	
Barium	0.57	ND (0.5)	>12
Cadmium	ND (0.008)	ND (0.02)	
Chromium	0.04	0.051	((¿,
Lead	ND (0.04)	ND (0.1)	
Mercury	NA	ND (0.001)	
Selenium	ND (0.1)	ND (1.5)	•
Silver	ND (0.006)	ND (0.015)	

BDL : Below detection limit.

ND : Not detected. NA : Not analyzed

Detection limit in parentheses.

Percent increase in double parentheses.

** % Reduction, Leachate Analysis; See text for calculation.

^{*} Indicator TCLP measures total xylenes and total phenols (sum of phenol, cresols, and 2,4-dimethylphenol).

to the detection limits that additional reduction, due to fixation could not be measured accurately.

Fixation process number 3: To determine the proper mix of cement, lime and fly ash, a homogenized sample of about 3 kg is used. A reagent formulation is selected, based on prior experience with similar wastes. The wastes and reagents are blended for about 10 minutes at room temperature with a mixer. There is a small temperature rise (around 5°C) during mixing due to the heat released by hydration. The mixture is then transferred to plastic cylinders, about 3 inches in diameter and 6 inches in height. The filled cylinders are then capped and stored to cure (i.e., harden) for about a month. Finally, a leachate test is done on the hardened materials.

The parameters that are adjusted to optimize performance include:

pH of the waste;

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- redox potential of the waste, (e.g., oxidation of cyanide or reduction of Cr (VI) to Cr (III);
- bulk ratio = weight of product/weight of waste;
- percent water;
- percent cement;
- percent lime;
- percent fly ash; and
- other additions to promote fixation (e.g., activated carbon or filler).

Performance data were obtained on samples of filter cake from a belt filter press operated at refinery Cl, and from a plate filter press in operation at refinery Bl. The bulking factor (ratio of total reagent to waste) used was 1.5. The reagent mix (cement:lime:fly ash) is considered proprietary. However, the same fixation formula was used for both types of wastes.

Performance data for fixation Process Number 3 for the belt filter cake is summarized in Table 6-9 and for the plate filter cake in Table 6-10. Incremental reductions in leachate concentrations of benzene, toluene, and xylenes, from 50 to 99+% were observed.

Indicator TCLP Leachate Concentrations of Belt Filter Cake
and Residue from Fixation Process # 3 - Refinery C1

	TCLP Levels,	<pre>\$ Reduction,</pre>	
Parameter	Belt Filter Cake	Fixed Residue	Leachate Analysis**
Lab. I.D.	62409-10	62687-02	
Volatile Organics			
Benzene	1.5	0.01	>99
Toluene	2.5	0.13	95
Xylenes	1.8	0.39	78
PNAs and Phenols			
Anthracene	ND (0.0004)	ND (0.003)	
Chrysene	ND (0.002)	ND (0.003)	
Naphthalene	0.1	0.004	96
Phenanthrene	ND (0.01)	0.01	
Phenols	ND (2.0)	ND (0.37)	
Metals			
Arsenic	ND (0.1)	0.02	
Barium	1.0	1.2	((20))
Cadmium	ND (0.02)	ND (0.025)	
Chromium	ND (0.025)	ND (0.05)	
Lead	ND (0.1)	ND (0.25)	
Mercury	NA	ND (0.001)	
Selenium	ND (0.3)	ND (0.02)	
Silver	ND (0.02)	ND (0.025)	
			

BDL : Below detection limit.

ND : Not detected. NA : Not analyzed

Detection limit in parentheses.

Percent increase in double parentheses.

** \$ Reduction, Leachate Analysis; See text for calculation.

^{*} Indicator TCLP measures total xylenes and total phenols (sum of phenol, cresols, and 2,4-dimethylphenol). Total characterization for metals.

Indicator TCLP Leachate Concentrations of Plate Filter Cake and Residue from Fixation Process # 3 - Refinery B1

TABLE 6-10

	TCLP Levels,	<pre>\$ Reduction</pre>	
Parameter	Plate Filter Cake	Fixed Residue	Leachate Analyses**
Lab. I.D.	62291-06	62687-01	
Volatile Organics . Benzene Toluene Xylenes	0.8 2.2 1.4	0.03 0.26 0.59	97 88 58
PNAs and Phenols Anthracene Chrysene Naphthalene Phenanthrene Phenols	BDL (0.002) BDL (0.002) 0.16 0.004 0.16	ND (0.10) ND (0.003) 0.1 0.01 0.07	38 ((150)) 56
Metals Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver	0.004 0.57 ND (0.06) ND (0.025) ND (0.1) ND (0.001) ND (0.004) ND (0.015)	0.01 1.5 ND (0.025) ND (0.05) ND (0.25) ND (0.001) ND (0.02) ND (0.025)	((150)) ((163))

BDL : Below detection limit.

ND : Not detected.

Detection limit in parentheses.

Percent increase in double parentheses.

^{*} Indicator TCLP measures total xylenes and total phenols (sum of phenol, cresols, and 2,4-dimethylphenol).

^{** %} Reduction, Leachate Analysis; See text for calculation.

Appendix O Treatability Testing Report



TREATABILITY TESTING REPORT FOR THE SOLIDIFICATION OF SOFT CONSISTENCY MATERIALS FROM THE GREINERS LAGOON SITE, SANDUSKY COUNTY, OHIO

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June 22, 2000 IT Project 806133



Table of Contents

10 INTRODUCTION	1
1 1 Site Description	1
1.2 Site Media Characterization and Description	2
1.3 Remedial Technology Description	2
2.0 TREATABILITY STUDY APPROACH	
2.1 Test Objectives and Rationale	3
2 2 Experimental Design and Procedures	
2.2.3 Solidification Treatability Testing on Composite A	4
2.2.4 Solidification Treatability Testing on Composite B	5
2.3 Equipment and Materials	7
2 3 1 Equipment	7
2 3 2 Materials	7
2 4 Sampling and Analysis	7
2.5 Data Management	8
2.5.1 Data in Bound Laboratory Notebooks	8
2.5.2 Analysis Reports	8
2.5 3 Computer Print-outs	8
2 5 4 Data Review	
3 0 RESULTS AND DISCUSSION	
3 1 Composite A	10
3 2 Composite B	
4 0 CONCLUSIONS AND RECOMMENDATIONS	
4.1 Composite A	
4 2 Composite B	
4.3 Overall	13

Appendix A - Analytical Report

Appendix B – UCS Reports

Appendix C - Permeability Reports

Appendix D - Triaxial Shear Reports



1.0 INTRODUCTION

1.1 SITE DESCRIPTION

On July 30, 1991, The Lubrizol Corporation (Lubrizol) entered into an Administrative Order by Consent (AOC) with U.S. EPA Region V pursuant to Section 106 of the Comprehensive Environmental Response Compensation and Liability Act of 1980 (CERCLA) to undertake action to produce an Engineering Evaluation/Cost Analysis (EE/CA) for the Greiner's Lagoon Site in Sandusky County, Ohio.

The Greiner's Lagoon Site is located south of Fremont, Ohio on County Road 181 about ½ mile west of Tiffin Road in Ballville Township, Sandusky County. The Site was originally developed by Mr. Terry Little in 1954 and consisted of four lagoons to store waste oil from nearby industry. After several changes in ownership, Mr. Gary Greiner purchased the Site in 1973. During the course of Site operations by the various owners, a number of community complaints and legal actions were undertaken because of odors and releases from the lagoons. In 1980, a judgment handed down by the Sandusky Court of Common Pleas ordered Mr. Greiner to clean up the Site. He did not comply with the order.

In 1981, 1982 and 1986-1988, U.S. EPA implemented Site removal actions including dike reinforcement, surface oil removal, liquid treatment and discharge, sludge solidification, lagoon backfilling, and placement of a soil cover over the filled lagoons. Between 1982 and 1985, Ohio EPA coordinated the delivery of sand and gravel washings from the processing of sugar beets and placement of the material in the open lagoons.

In July 1991, Lubrizol entered into the AOC with U.S. EPA Region V, under which an EE/CA is being developed. During August 1991, Lubrizol arranged for the removal of the access road adjacent to the Site, improvement of surface water drainage, and installation of a fence to improve Site security. During 1996, 1997 and 1998, Lubrizol conducted sampling and analysis activities in accordance with a U.S. EPA- and Ohio EPA-approved EE/CA Work Plan. In addition, in 1997 and 1998 Lubrizol repaired areas of visible seepage at the Site using compacted clay, topsoil and seeding and riprap.

The recommended remedial action (Alternative 4) as stated in the EE/CA Report involves physical solidification of selected portions of the consolidated materials as necessary to provide adequate support for construction of a cap in accordance with OAC 3745-27-11. The physical solidification will be accomplished by mixing clean material, flyash, hydrated lime, etc. with the consolidated material to attain the desired engineering properties, where necessary to ensure that there is adequate support of a cap. Under this alternative, improved fencing and security are provided to control access to the Site and to help ensure the long-term integrity of the cap. Approximately 3.2 acres will be covered with the OAC 3745-27-11 cap.

An August 27, 1998 meeting with U.S. EPA, Ohio EPA, ERM and Lubrizol representatives resulted in consideration of a OAC 3745-27-11 compliant cap design that included a 12 inch prepared base, FML/GCL combination drainage layer, 18 inches of rooting zone soil and 6 inches



of topsoil. The cap would be sloped for proper drainage and periodic maintenance of the cover would be required. A preliminary grading determination indicates a 3' thick cap with approximate balance between cut'fill can be accomplished. It is further determined that existing drainage patterns will be maintained (run-off to all four sides of the cap) and that no stormwater detention will be required. Finish grade will be approximately 682' at the top of the cap with a gradual slope (4.5% slope) to 668' at the south end, a distance of approximately 310'. As such, total maximum depth of cover including the cap is 19' of soil. The estimated stress at the 663' is 13 psi

1.2 SITE MEDIA CHARACTERIZATION AND DESCRIPTION

In 1996, ERM collected 22 Shelby tubes during the advancement of the stabilized material soil borings. These borings were performed to collect geotechnical strength data on the subsurface material in the stabilized lagoon area. During laboratory procedures, it was determined that results could be obtained from only 5 of the tubes. ERM attempted to perform triaxial shear analysis on 5 samples recovered from those tubes. During performance of the tests and reduction of the data, the material demonstrated sufficient variability as to invalidate any results obtained.

As such, ERM utilized blow count data to demonstrate the in-situ strength of the stabilized material. Review of the blow count data indicates patterns of strength for two groups of stabilized material borings

The SM1 through SM4 borings at the north end of the Consolidation Area showed one pattern of strength prior to reaching natural material. Depths of 0 to 15 feet indicated soft to medium consistency materials generally equating to an unconfined compressive strength of 3 psi to 14 psi. Depths of 15 to 20 feet showed very stiff consistency materials equating to an unconfined compressive strength of 28 to 55 psi.

The SM5 through SM8 borings at the south end of the Consolidation Area showed a pattern of higher strength prior to reaching natural materials. Depths from 0 to 7 feet showed stiff consistency materials equating to an unconfined compressive strength of 14 to 28 psi. Depths of 7 to 11 feet showed very stiff consistency materials generally equating to an unconfined compressive strength of 28 to 55 psi. Depths of 11 to 16 feet showed stiff to very stiff consistency materials generally equating to an unconfined compressive strength of 14 psi to 42 psi

1.3 REMEDIAL TECHNOLOGY DESCRIPTION

The technology selected for the bench-scale treatability study is solidification. The structural integrity and durability are also enhanced during solidification, as the treated material has increased compressive strength and load-bearing capacity



2.0 TREATABILITY STUDY APPROACH

2.1 TEST OBJECTIVES AND RATIONALE

The objectives of the solidification bench-scale treatability study were to provide information to:

- Determine the increase in compressive strength due to the solidification treatment.
- Establish parameters for field solidification operations.

Though formulations have been identified, from treatability testing at other sites, which meet the performance criteria for the solidification treatment of the site media at Greiners Lagoon Site, additional treatability testing is required to further optimize these formulations.

2.2 EXPERIMENTAL DESIGN AND PROCEDURES

2.2.1 Treatability Study Samples

Seven soil borings were advanced in the former lagoons in areas where soils had blow counts of <10/foot during previous site investigations. The borings were advanced using hollow stem augers with a motorized drilling rig. Soil samples were collected continuously using a split-spoon sampler to a depth of approximately 12-14 feet below grade in each of the borings. Samples from each boring were deposited into a dedicated 5-gallon bucket for shipment to the treatability lab.

The seven 5-gallon buckets were shipped in accordance with applicable DOT hazardous material shipping regulations to IT Corporation's laboratory in Knoxville, Tennessee for the solidification bench-scale treatability testing.

2.2.2 Laboratory Sample Characterization and Compositing

To assess the degree of homogeneity among the seven individual 5-gallon buckets, a portion of each bucket was analyzed for the parameters listed in Table 2-1.

Following receipt and review of the laboratory characterization results, it was decided to make two composite samples for treatability testing. Composite A, representing low (<250 mg/kg) lead and low (<2%) oil & grease material, was produced by compositing samples TS-3, TS-4, TS-5, and TS-7. Composite B, representing high (>1,000 mg/kg) lead and high (>7%) oil & grease material, was produced by compositing samples TS-2 and TS-6.



Sample	TS-1	TS-2	TS-3	TS-4	TS-5	TS-6	TS-7		
Parameter		Results							
рН	111	91	12.2	12.2	11.2	12.1	9.2		
Bulk Density (lb/ft ³)	107 1	1168	105 3	100.3	119.4	114.7	123.6		
Moisture Content (%)	21.8	22 1	32 6	31.5	19.0	16.6	18.5		
Oil & Grease Content (%)	2.9	99	0.25	1.5	1.4	7.7	1.9		
Solids Content (%)	78.2	77.9	674	68.5	81.0	83.4	81.5		
Alkalinity (% as CaCO ₃)	27	24	30	27	28	22	22		
Benzene (µg/kg)	7,500	13.000	3.000	4,300	7,700	31,000	7,800		
Chromium VI (mg/kg)	<150	<150	<150	<150	<150	<150	<150		
Lead (mg/kg)	1,300	1.600	82	220	44	1,100	170		

Table 2-1 Parameters for Characterization of the Samples

2.2.3 Solidification Treatability Testing on Composite A

Portions (~ 750 grams) of the homogenized composite sample were mixed with a variety of stabilization reagents known to be effective for the solidification of oily media, while producing high unconfined compressive strength. These reagents are fly ash products, cement products, and hydrated lime products. The initial formulations are listed in Table 2-2.

All formulations were mixed using a planetary mixer operating at 30-40 rpm for 45 to 60 seconds. The reagents were combined and slurried 1 1 (w/w) with water prior to being added to the composite material. No adverse reactions, emissions, or odors were noted during the mixing of the reagents and Composite A material. The treated material from each formulation were placed into two 2"x4" molds and two 3" x 6" right cylinder molds. The molds were cured at 95% relative humidity and ambient temperature. After 7 days of curing, one of the 2" x 4" molds from each formulation was subjected to unconfined compressive strength (UCS) testing. Based on visual observation and test results from the 7-day test, selected formulations were subjected to UCS testing, SPLP, and permeability after 14 days of curing and triaxial shear testing after 28 days of curing.

Based on the results of the initial formulations after 14 days of curing, a second round of formulations for Composite A was prepared (Table 2-2) These additional formulations were prepared and tested as the initial formulations for Composite A.



Round	Formulation		Reag	ent Mix R	atio	
		Portland	Class F	Class C	Hydrated	Water
		Cement	Fly Ash	Fly Ash	Lime	
	LBA-2	0.10				0.10
Initial	LBA-4	0.20				0.20
1	LBA-6	0.10	0.10			0.20
	LBA-8	0.15	0.15			0.30
	LBA-10	0.20	0.15			0.35
	LBA-15	0.15		0.15		0.30
	LBA-18	0.20		0.20		0.40
	LBA-19		0.10		0.05	0.15
	LBA-24		0.20		0.15	0.35
	LBA-25	0.15				0.15
Second	LBA-26	0.15		0.10		0.25
	LBA-27	0.15			0.05	0.20
	LBA-28	0.10			0.10	0.20

Table 2-2. Solidification Formulations for Treatability Testing on Composite A

2.2.4 Solidification Treatability Testing on Composite B

Portions (~ 750 grams) of the homogenized composite sample were mixed with a variety of stabilization reagents known to be effective for the solidification of oily media, while producing high unconfined compressive strength. These reagents are fly ash products, cement products, and hydrated lime products. The initial formulations are listed in Table 2-3.

All formulations were mixed using a planetary mixer operating at 30-40 rpm for 45 to 60 seconds. The reagents were combined and slurried 1:1 (w/w) with water prior to being added to the composite material. No adverse reactions, emissions, or odors were noted during the mixing of the reagents and Composite B material. The treated material from each formulation were placed into two 2"x4" molds and two 3" x 6" right cylinder molds. The molds were cured at 95% relative humidity and ambient temperature. After 7 days of curing, one of the 2" x 4" molds from each formulation was subjected to unconfined compressive strength (UCS) testing. Based on visual observation and test results from the 7-day test, selected formulations were subjected to UCS testing, SPLP, and permeability after 14 days of curing and triaxial shear testing after 28 days of curing.

¹ Mix Ratio = [(weight reagent)/(weight waste)]



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Table 2-3 Solidification Formulations for Treatability Testing on Composite B

Round	Formulation			Reagent !	Mix Ratio ¹		
		Portland	Class F	Class C	Hydrated	Calcium	Water
		Cement	Fly Ash	Fly Ash	Lime	Carbonate	
	LBB-2	0 10					0.10
Initial	LBB-4	0.20	Í				0.20
	LBB-6	0.10	0 10				0.20
	LBB-8	0 15	0 15				0.30
	LBB-10	0.20	0 15		·		0.35
	LBB-15	0 15	ļ	0 15			0.30
	LBB-18	0.20		0.20			0.40
	LBB-19		0 10		0.05		0.15
	LBB-24		0.20		0.15		0.35
	LBB-25	0.20			0.10		0.30
Second	LBB-26		0.20		0.15		0.35_
	LBB-27	0.20	<u> </u>		0.10		0.30
	LBB-28	0.20			0.05		0.25
	LBB-29	0.15			0.10	·	0.25
	LBB-30	0.15			0.05		0.20
	LBB-31	0.10			0.10		0.20_
	LBB-32	0.20				0 10	0.30
	LBB-33	0.20				0.20	0.40
Third	LBB-34	0.15			0.05		0.20
	LBB-35	0.10			0.10		0.20

¹ Mix Ratio = [(weight reagent)/(weight waste)]

Based on the results of the initial formulations after 7 days of curing, a second round of formulations for Composite B was prepared (Table 2-3). These additional formulations were prepared and tested as the initial formulations for Composite B. Based on the results of the second round of formulations after 14 days of curing, a third round of formulations for Composite B were prepared (Table 2-3). These additional formulations were prepared and tested as the initial and second formulations for Composite B, with the exception that the lime reagent (calcium hydroxide or calcium carbonate) slurry was added to the composite material, then the Portland cement slurry was added



2.3 EQUIPMENT AND MATERIALS

2.3.1 Equipment

The laboratory equipment and purpose for each equipment item for the solidification treatability testing included:

- Hobert Kitchenaid 5-quart mixer incorporation of reagents
- 1000 ml plastic beakers measurement of reagents
- 500 ml glass jars analytical testing
- 2"x4" and 3"x 6" right cylinder molds casting of cylinders

2.3.2 Materials

The stabilization reagents used included fly ash products, cement products, and lime products from northwest Ohio.

The Portland cement was Type I and was obtained from Holnam Cement. The Class C and Class F flyash materials were obtained from Mintek Resources (Beaver Creek, Ohio). The hydrated lime was obtained from Genlime (Genoa, Ohio). The ground calcium carbonate was obtained from National Stone and Lime (Findlay, Ohio).

2.4 SAMPLING AND ANALYSIS

Representative samples of the homogenized samples were collected and analyzed for the parameters listed in Table 2-4. A representative sample of each of the solidification reagents was analyzed for the appropriate parameters listed in Table 2-4.

Table 2-4 Parameters for Characterization of the Site Media Samples

Parameter	Methodology
pН	SW-846 Method 9045
Bulk Density	ASTM Method D5057
Moisture Content	ASTM Method D2216- 98
Oil & Grease Content	EPA Method 413.1
Solids Content	ASTM Method D2216-98
Lead	SW - 846 Method 6010
Alkalinity	EPA Method 310.1
Benzene	SW - 846 Method 8240
Chromium VI	SW – 846 Method 7197

Samples of the solidification treated material produced during the solidification treatability testing



were analyzed for the parameters listed in Table 2-5

Table 2-5 Analytical Testing Parameters for the Solidification Treated Material

Parameter	Methodology
Unconfined Compressive Strength (unsaturated)	ASTM D2166
Triaxial Strength (saturated) ^A	ASTM D2850 – 95e1
Permeability ^A	ASTM D5084
Synthetic Precipitation Leaching Procedure (SPLP) ^A	SW846 MTD3 12
Benzene ⁴ (Leachable)	SW-846 Method 8240
Chromium VI ^A (Leachable)	SW846 Method 7197
Lead ^A (Leachable)	SW-846 Method 6010

A Only on select formulations

2.5 DATA MANAGEMENT

All raw data from the solidification bench-scale treatability study reside in bound laboratory notebooks, analytical reports from IT Corporation's Analytical Division or outside analytical laboratories, or computer-generated printouts from computer-controlled equipment.

2.5.1 Data in Bound Laboratory Notebooks

All entries in bound laboratory notebooks were made in black ink and were considered raw data. At the end of each entry, the initials of the laboratory personnel responsible and date were entered. All corrections were initialed and dated at the time of correction and a note explaining the correction included.

2.5.2 Analysis Reports

All analytical reports from IT Corporation's Analytical Division or outside analytical laboratories were maintained as raw data. Any corrections or additions to analytical reports previously received were accompanied by a written explanation from the analytical laboratory. Treatability Laboratory personnel were not allowed to make corrections to analytical reports from IT Corporation's Analytical Division or outside analytical laboratories.

2.5 3 Computer Print-outs

Computer printouts from computer-controlled equipment were maintained as raw data. The initials of the equipment operator and the date of generation were added to each page of all such computer printouts Regenerated printouts were identified as such and any corrections noted.





2.5.4 Data Review

Prior to issuing a final report, all pertinent raw data was reviewed to ensure the data quality. The Treatability Laboratory Manager reviewed all relevant laboratory notebook pages, computer printouts, and analytical reports. Any discrepancies in the raw data uncovered in this or any review was immediately brought to the attention of the appropriate laboratory personnel and corrected.



3.0 RESULTS AND DISCUSSION

The testing results for the formulations prepared for Composite A and Composite B are discussed below. Appendices A through C contain the testing reports for the formulations.

3 I COMPOSITE A

Table 3-1 summarizes the testing results for the Composite A formulations. For the initial formulation round, formulations LBA-4, LBA-8, LBA-10, LBA-15, and LBA-18 attained over 25 psi UCS within 14 days of curing Formulations LBA-4, LBA-10, LBA-15, and LBA-18 were selected for further testing Formulation LBA-8 was not selected because this formulation is similar to LBA-10, which had slightly more Portland cement and slightly higher UCS value.

Round	Formulation	U.	CS	SPLP (µg/L			Permeability	Triaxial Shear	
_	<u> </u>	7 Day	14 Day	Benzene	Chromium	Lead	(cm/s)	(psi)	
	LBA-2	8.2	165	•-			-	••	
lnutral	LBA-4	22.1	83.3	4~	<5	<50	1.9E-09	308	
	LBA-6	14.0	187						
	LBA-8	34.1	46.5				-		
	LBA-10	41.5	50 5	11	<5	<50	2.5E-09	169	
	LBA-15	68.2		48	< 5	<50	4.1E-07	51 7	
	LBA-18	91.0		2 -	< 5	<50	3.5E-07	67.4	
	LBA-19	7.1	- 8	• ••					
	LBA-24	187	20 3					-	
	LBA-25	110	16 1					••	
Second	LBA-26	52.3	64.2	97	21	37	3 0E-07	24.6	
	LBA-27	20.6	~36	81	19	67	2.7E-06	71.0	
	LBA-28	22.5	33 9				-	**	

Table 3-1 Testing Results for Composite A Formulations

Note: Anticipated SPLP criteria for benzene, chromium and lead are 0.5, 5.0, and 5.0 mg/L, resectively

All of the initial round formulations tested had low levels of SPLP-leachable benzene, chromium, and lead, well below RCRA toxicity characteristic levels. These formulations also had permeabilities below 10⁻⁶ cm/s and triaxial shear strengths above 50 psi. The treated materials from these formulations would be suitable to support the proposed capping structure.

For the second formulation round, attempts were made to reduce the amount of reagents required for the solidification treatment. Formulations LBA-26, LBA-27, and LBA-28 attained over 25 psi UCS within 14 days of curing. Formulations LBA-26 and LBA-27 were selected for further testing. Formulation LBA-28 was not selected because this formulation is similar to LBA-27, which had slightly more Portland cement and slightly less hydrated lime and slightly higher UCS value. All of the second round formulations tested had low levels of SPLP-leachable benzene, chromium, and lead. These formulations also had permeabilities near or below 10-6 cm/s and triaxial shear strengths above 20 psi. The treated materials from these formulations would be



suitable to support the proposed capping structure.

3.2 COMPOSITE B

Table 3-2 summarizes the testing results for the Composite B formulations. For the initial formulation round, none of the formulations had over 25 psi UCS within 14 days of curing. Formulations LBB-25 indicated that the combination of Portland cement and hydrated lime may increase the UCS value and second formulation round focused on Portland cement/hydrated lime and Portland cement/calcium carbonate formulations. Formulations LBB-27, LBB28, LBB-29, LBB30, LBB31, LBB32, and LBB-33 developed over 25 psi UCS within 14 days of curing. Formulations LBB-28, LBB-29, LBB-30, LBB-31, and LBB-32 were selected for further testing. Formulation LBB-27 was similar to LBB-28, which had the same amount of Portland cement and slightly less hydrated lime. Formulation LBB-33 was not selected because this formulation is similar to LBB-32, which had the same amount of Portland cement and slightly less calcium carbonate and had a slightly higher UCS value.

Table 3-2. Testing Results for Composite B Formulations

Round	Formulation	U	CS		SPLP (µg/L)		Permeability	Triaxial Shear
L		7 Day	14 Day	Benzene	Chromium	Lead	(cm/s)	(psi)
	LBB-2	ns	ns					
Initial	LBB-4	7.0	10.3	••				
j	LBB-6	7.9	7.4	•			•	
l i	LBB-8	7.8	12.9	•				
[LBB-10	8.9	12.0	•			-	
	LBB-15	5.0	8.8				•	
	LBB-18	16.7	18.0				••	
(LBB-19	7.3	6.1					
j	LBB-24	7.7	8.4					
	LBB-25	73.7			-~			
Second	LBB-26	10.9				•		
] [LBB-27	106.4				•		
	LBB-28	67.9		24	120	770	7.7E-06	37.6
[LBB-29	75.7		36	110	990	1.1E-06	27.6
[LBB-30	46.0	55.0	110	120	780	8.7E-06	27.0
] [LBB-31	45.2	53.5	110	49	1,600	5.2E-06	22.9
	LBB-32	4.4	57.7	110	110	450	8.3E-06	21.5
	LBB-33	9.8	29.7				-	
Third	LBB-34	7.8	53.0					
	LBB-35	53.7	64.7					

ns = no strength

Note: Anticipated SPLP criteria for benzene, chromium and lead are 0.5, 5.0, and 5.0 mg/L, repectively

The SPLP results for the second round formulations varied in the amount of SPLP-leachable benzene and lead, while the SPLP-leachable chromium was fairly constant. The variation in



STABILIZATION TREATABILITY TESTING

SPLP-leachable benzene and lead do not correlate to the reagent amount or alkalinity in the formulation. The SPLP-leachable levels for benzene, chromium, and lead were well below the RCRA toxicity characteristic levels. These formulations also had permeabilities near 10⁻⁶ cm/s and triaxial shear strengths above 20 psi. The treated materials from these formulations would be suitable to support the proposed capping structure

For the third formulation round, attempts were made to determine if the reagent addition sequence alters the strength development. Formulation LBB-35 had similar strength development to formulation LBB-31. However, formulation LBB-34 had less strength development in 7 days, when compared to formulation LBB-30. However, at 14 days, these formulations had similar strength development. Neither formulation LBB-34 or LBB-35 were selected for further testing since the overall strength development was similar to previous formulations.



4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 COMPOSITE A

Composite A represents contaminated material from Greiner's Lagoon Site which has low (less than 250 mg/kg) lead and low (less than 2%) oil & grease contents. 2/3 of the contaminated material at the Greiner's Lagoon Site.

The Composite A material can be solidified, resulting in a low-permeability treated material which can easily support the proposed capping structure and will have minimal impact to human health and the environment due to leaching. Formulations with Portland cement (LBA-4) or combinations of Portland cement with Class F fly ash (LBA-10), Class C fly ash (LBA-15, LBA-18, and LBA-26) and hydrated lime (LBA-27) all produce suitable treated material

4.2 COMPOSITE B

Composite B represents contaminated material from Greiner's Lagoon Site which has high (greater than 1,000 mg/kg) lead and high (greater than 7%) oil & grease contents.

The Composite B material can be solidified, resulting in a low-permeability treated material which can easily support the proposed capping structure and will have minimal impact to human health and the environment due to leaching. Formulations with Portland cement in combination with hydrated Lime (LBB-28, LBB-29, LBB-30, and LBB-31) and calcium carbonate (LBB-32) all produce suitable treated material.

4.3 OVERALL

IT Project 806133

Though different formulations are effective on the Composite A and Composite B materials, a more efficient remedy would be obtained by employing a common formulation for both composite materials. Formulation LBA-27 and LBB-30 are both comprised of a 0.15 mix ratio of Portland cement and a 0.05 mix ration of hydrated lime. The treated material from these formulations have low permeability, can easily support the proposed capping structure and will have minimal impact to human health and the environment due to leaching. Therefore, the recommended formulation for the solidification of the soft consistency material at the Greiner's Lagoon Site is the combination of a 0.15 mix ratio of Portland cement and a 0.05 mix ratio of hydrated lime.

The reagents were added as a 1:1 (w/w) slurry with water to simulate current practices for in-situ solidification. There is no technical reason to prevent the solidification contractor from mixing dry reagents with the soft consistency material during full-scale treatment, as long as sufficient water is added to facilitate the mixing of the reagents and contaminated material and to adequately hydrate the reagents.



STABILIZATION TREATABILITY TESTING

The mixing of the regents and composite materials was designed to simulate thorough mixing and the production of a homogeneous treated material. As long as a homogeneous treated material is produced, the ex-situ or in-situ solidification treatment technology would be applicable to the full-scale solidification treatment



Appendix A - Analytical Reports

3/6

MICROSPEC ANALYTICAL GROUP, LTD.

Analytical Laboratory and Testing Services

3352 128th Avenue, Hotand, Michigan 49424-9263 Phone: 616-399-6070 FAX: 616-399-6185 E-Mail: info@mspec.com Internet: http://www.mspec.com

CLIENT:

ERM, Inc.

355 E. Campus View Blvd. #250

Columbus, OK 43235

Attn: Nike Thede

Imbrizol - Greiner's Lagoon

DATE:

March 14, 2000

AVALYSIS OF:

Sludge & Solids Samples

REPORTED BY:

DATE RECEIVED:

Received from IT Corp on March 7, 2000.

Sample ID: TS-1

Lab ID: 0003094-01

collected: 03/06/00

_	KESUL	Deits	MALYIED	BY	METROD	RT.
_kalinity (as CaCO3)	27	\$ CaCO3 equiv	03/14/00	MBR	ASA 91-4	2
Density	107.1	lbs/cu ft, bul	03/13/00	MBR	ASTRO5057-90	
Grease & Oil	29,000	ong/kg dry wt.	03/03/00	WS	EPA 1664	1.0
Bexavalent Chronium Prep	03/08/00	date extracted	03/08/00	E2	D3987-85	•
Yeisture (104 °C)	8. 25	& by wt as rec	03/09/00	JA	APEA 2540 B	N/A
•	11.1	s.u.	03/08/00	WS	EPA 9045	0-14
tal Solids (104 °C)	78.2	% of sample	03/09/00	JA	APEA 2540 B.	N/A
Chromium, Hexavalent	NC.	mg/kg dry wt.	03/08/00	MBR	EPA 7196	0.15
Lead	1,300	mg/kg dry wt.	03/14/00	KER	EPA 6010	2.2
Metals Prep, Solid	03/08/00	date digested	//	JA	EPA 3050	
Benzene	7,500	ug/kg dry wt	03/13/00	JA	EPA 3260	10

Sample ID: TS-2

Lab ID: 0003094-02

Collected: 03/06/00

TEST	RESULT	units	PESTATED	BT	METHOD	RL
Alkalinity (as CaCO3)	24	% CaCO3 equiv	03/14/00	HSR	ASA 91-4	2
Density	116.8	lbs/cc ft, bul	03/13/00	MER	ASTMD5057-90	
Grease & Oil	99,000	mg/kg dry wt.	03/08/00	WS	EPA 1664	1.0
Bexavalent Chromium Prep	03/08/00	date extracted	03/05/00		D3987-85	
Moisture (104 °C)	72.1	& by wt as rec	03/09/00		APEA 2540 B	
. Bg	9_1	s.u.	03/06/00	RS	EPA 9045	0-14
Total Solids (104 °C)	77.9	t of sample	03/09/00	JA	APHA 2540 B.	M/A
romium, Bexavalent	100	pg/log dry ut.	03/08/00	KER	EPA 7196	0.15
.:ad	1,600	mg/kg dry wt.	03/14/00	MBR	EPA 6010	2.2
metals Prep, Solid	03/08/00	date digested	,,	JA	EPA 3050	
Benzene	13,000	µg/kg dry wt	03/13/00	<i>-</i> 73	EPA 8260	10

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4/6

MICROSPEC ANALYTICAL GROUP, LTD.

pple ID: IS-3

Lab ID: 0003094-03

Collected: 03/06/00

TEST	RESULT	UNITS	ANALYZED	BY	METROD	RL.
Alkalinity (as CaCO3)	30	% CaCO3 equiv	03/14/00	MBR	ASA 91-4	2
Density	105.3	lbs/cu ft, bul	03/13/00	MBR	ASTMD5057-90	
Grease & Oil	2,500	mg/kg dry wt.	03/03/00	WS	EPA 1664	1.0
Eexavalent Chromium Prep	03/08/00	date extracted	03/08/00	WS	D3987-35	
Moisture (104 °C)	32.6	& by wt as rec	03/09/00	JA	APRA 2540 B	
PH	12.2	s.u.	03/08/00	RS	EPA 9045	0-14
Total Solids (104 °C)	67-4	% of sample	03/09/00	JA	APHA 2540 B.	N/A
Chromium, Hexavalent	ND	mg/log dry wt.	03/08/00	MBR	EPA 7196	0.15
Lezi	. 32	mg/kg dry wt.	03/13/00	MBR	EPA 6010	2.2
Metals Prep, Solid	03/08/00	date digested	- 1	JA	EPA 3050	
Benzene	3,000	µg/kg dry wt	03/13/00	JA	EPA 8260	10

Sample ID: TS-4

Lab ID: 0003094-04 Collected: 03/06/00

TEST	RESULT	UNITS	ANALYMED	by	METEOD	RL.
kalinity (as CaCO3)	27	\$ Caccol equiv	03/14/00	MBR	ASA 91-4	2
vensity	100.3	1bs/cu ft, bul	03/13/00	MBR	ASTMD5057-90	
Grease & Oil	15,000	mg/kg dry wt.	03/08/00	WS	EPA 1664	1.0
Eexavalent Chromium Prep	03/09/00	date extracted	03/08/00	WS	D3987-85	
Moisture (104 °C)	31.5	\$ by wt as rec	03/09/00	JA	APHA 2540 B	N/A
PH	12-2	s.u.	03/08/00	WS	EPA 9045	0-14
fotal Solids (104 °C)	68.5	% of sample	03/09/00	JÀ	APHA 2540 B.	N/A
omium, Hexavalent	ND	mg/kg dry wt.	03/08/00	MBR	EPA 7196	0.15
d	220	mg/kg dry wt.	03/13/00	MBR	EPA 6010	2.2
ictals Prep, Solid	03/08/00	date digested	,,	JA	EPA 3050	
izene	4,300	µg/kg dry wt	03/13/00	JA	EPA 8260	10

Sample ID: TS-5

Lab ID: 0003094-05

Collected: 03/06/00

	<u>.</u>					
TEST	RESULT	UNITS	ANALYZED	BY	METHOD	RL.
Alkalinity (as CaCO3)	28	% CaCO3 equiv	03/14/00	MBR	ASA 91-4	2
Density	119.4	lbs/cu ft, bul	03/13/00	MBR	ASTMD5057-90	
Grease & Oil	14,000	mg/kg dry wt.	03/02/00		EPA 1664	1.0
	03/08/00	date extracted	03/08/00	WS	D3987-25	
ravalent Chromium Prep	19.0	* by we as rec	03/09/00		APBA 2540 B	N/A
PH	11.2	s.u.	03/08/00		EPA 9045	0-14
Total Solids (104 °C)	81.0	% of sample	03/09/00		APHA 2540 B.	N/A
Chromium, Eexavalent	ND	mg/kg dry wt.	03/08/00		EPA 7196	0.15
Lead	44	mg/kg dry wt.	03/14/00		EPA 6010	2-2
Metals Prep, Solid	03/08/00	date digested	,,	JA	EPA 3050	
Benzene	7,700	µg/kg dry wt	03/13/00	JA	EPA 8260	10

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le ID: IS-6

Lab ID: 0003094-06 Collected: 03/06/00

TEST	RESULT	UNITS	MOTTARD	BY	METER	RL
Alkalinity (as CaCO3)	22	1 CaCO3 equiv	03/14/00	MBR	ASA 91-4	2
Density	114.7	lbs/cu ft, bul	03/13/00	MBR	ASTHD5057-90	
Grease & Oil	77, COC	mg/kg dry wt.	03/08/00	WS	EPA 1664	1-0
Hexavalent Chromium Prop	03/08/00	date extracted	03/08/00	WS	D3987-85	
Moisture (104 °C)	16.6	8 by we as rec	03/09/00	JA	APEA 2540 B	N/A
pff	12.1	8.0.	03/08/00	WS	EPA 9045	0-14
Total Solids (104 °C)	23.4	t of sample	03/09/00	JA	APHA 2540 B.	M/A
Chromium, Bexavalent	MD	mg/kg dry ut.	03/08/00	MBR	EPA 7196	0-15
Lead	1,100	mg/kg dry wt.	03/14/00	MBR	EPA 6010	2.2
Metals Prep, Solid	03/06/00	date digested	,,	JA	EPA 3050	
Benzene	31,000	μg/kg dry wt	03/13/00	JA	EPA 8260	10

Sample ID: TS-7

Lab ID: 0003094-07 Collected: 03/06/00

1351	RESULT	WITS.	MALYED	RY	HE-TROD	RL
'inity (as CaCO3)	22	% CaCO3 equiv	03/14/00	MBR	ASA 91-4	2
-y	123.6	lbs/cu ft, bul	03/13/00	MBR	ASTIO5057-90	
- € Oil	19,000	mg/kg dry wt.	03/08/00	WS	EPA 1664	1.0
.valent Chronium Prep	03/08/00	date extracted	03/08/00	WS	D3987-85	
Hoisture (104 °C)	18.5	& by wt as rec	03/09/00	JA	APEA 2540 B	N/A
PE .	9_2	5.G.	03/08/00	WS	EPA 9045	0-14
Total Solids (104 °C)	81.5	t of sample	03/09/00	JA	APHA 2540 B.	M/A
Chronium, Eexavalent	MD	mg/kg dry wt.	03/08/00	MBR	EPA 7196	0.15
Lead	170	mg/kg dry vt.	03/13/00	PER	EPA 6010	2.2
Frals Prep, Solid	03/08/00	date digested	, 50,	J2	EPA 3050	
ere	7,600	ug/kg dry vt	03/13/00	JA	EPA 8260	10

Sample ID: Ripsco "C" Plyash

Lab ID: 0003094-08 Collected: 03/06/00

2852	RESULT	WIIS	MOTASED	KI	METHOD	RT.
Bexavalent Chronium Prep	03/09/00	date extracted		JA.	D3987-85	
Total Solids (104 °C)	99.9	t of sample	03/09/00	JA	APEA 2540 B.	K/K
Chromium, Mexavalent	4.3	eng/keg dry wt.			EPA 7196	0.15
Lead	20	eg/kg dry vt.	03/13/00	MBR	EPA 6010	2.2
Metals Prep, Solid	03/08/00	date digested	•	JA	EPA 3050	

Sample ID: PC

Lab ID: 0003094-09 Collected: 03/06/00

1531	RESULT	UNIES	ANALYZED	KY	METBOD	RL
cavalent Chronium Prep .utal Sclids (104 °C) Chronium, Hexavalent Load Matals Prep, Solid	03/09/00 99.9 1.5 9.1 03/08/00	date extracted t of sample mg/kg dry wt. mg/kg dry wt. date digested			D3987-85 APEA 2540 B. EPA 7196 EPA 6010 EPA 3050	N/A 0.15 2.2

PAGE.04

6/6

MICROSPEC ANALYTICAL GROUP, LTD.

mple ID: US Ash Type "F" Flyash

Lab ID: 0003094-10 Collected: 03/06/00

Test	RESULT	UNITS	ANALYZED	BY	METHOD	RL.
Rexavalent Chromium Prep Total Solids (104 °C) Chromium, Hexavalent Lead Metals Prep, Solid	03/09/00 99.8 6.3 38 03/08/00	date extracted to f sample mg/kg dry wt. mg/kg dry wt. date digested	03/09/00	KBR		N/A 0.15 2.2

Sample ID: Genline

Lab ID: 0003094-11 Collected: 03/06/00

TEST	RESULT	UNITS	AMALYZED	BY	METROD	RL
Rexavalent Chromium Prep Total Solids (104 °C) Chromium, Rexavalent Lead Ketals Prep, Solid	03/09/00 100 0.52 ND 03/08/00	date extracted % of sample mg/kg dry wt. mg/kg dry ut. date digested	03/09/00 03/09/00 03/13/00	MBR	D3987-85 APHA 2540 B. EPA 7196 EPA 6010 EPA 3050	N/A 0.15 2.2

Sample ID: Trip Blank 1502 (48-0086) Lab ID: 0003094-12

Collected: 03/06/00

TEST	RESULT	UNITS	ARALYZED	BY	METHOD	RL.
zeze	מא	µg/Z	03/10/00	DAH	EPA 8260	1.0

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PAGE 02/03



MICROSPEC ANALYTICAL GROUP, LTD. 3352 128th Avenue, Holland, Michigan 49424-9263

Analytical Laboratory and Testing Services

Phone: 616-399-6070 FAX: 616-399-6185

E-Mail: info@mspec.com Internet: http://www.mspec.com

CLIENT:

ERM, Inc.

355 E. Campus View Blvd. #250

Columbus, OH 43235

Attn: Sue Dragt

Lubrizol/Greiner's Lagoon Re:

DATE:

April 14, 2000

AMALYSIS OF:

Treated Solids Samples

REPORTED BY:

DATE RECEIVED:

Received from IT Corp. on April 5, 2000.

.. ID: LBA-4

Lab ID: 0004047-01

Collected: 04/04/00

1287	RESULT	UNITS	AMATASED	BY	METROD	. RL
pR	12.6	s.u.	04/06/00	ws	BPA 9040	0-14
Syn. Popt. Leaching Proc.	04/07/00	date extracted	04/07/00	WS	EPA 1312	
Chromium, Hexavalent	, MD	mg/L	04/07/00	MBR	EPA 7196	0.005
4	MD	mq/L	04/11/00	MBR	EPA 6010	0.050
Als Prep, Aqueous	04/07/00	date digested	1	MBR	EPA 3010M	
Benzene	47	μg/L	04/12/00	BT	EPA 8260	1.0
Syn. Pcpt. Leaching Proc.	04/06/00	date extracted	7-1-	BT	BPA 1312	

imple ID: LBA-10

Lab ID: 0004047-02

Collected: 04/04/00

.7	RESULT	THITS	MALYSED	BY	METEOD	RL.
pfi	12.5	s.u.	04/06/00	WS	EPA 9040	0-14
Syn. Pcpt. Leaching Proc.	04/07/00	date extracted	04/07/00	WS	EPA 1312	
Chromium, Hexavalent	MD	mq/L	04/07/00	MBR	EPA 7196	0.005
Load	MD	mq/L	04/11/00	MBR	EPA 6010	0.050
Metals Prep, Aqueous	04/07/00	date digested	,	MBR	EPA 3010M	
Penzene	11	49/L	04/12/00	BT	EPA 8260	1.0
Syn. Pept. Leaching Proc.	04/06/00	date extracted	, -, -, -,	BT	EPA 1312	

Sample IB: LBA-15

Lab ID: 0004047-03

Collected: 04/04/00

TEST .	RESULT	UNITS	AWALYZED	BY	METROD	RIL
pil	12.4	s.u.	04/06/00	WS	EPA 9040	0-14
Syn. Pept. Leaching Proc.	04/07/00	date extracted	04/97/00	WS	EPA 1312	
Chromium, Hexavalent	MD	mg/L	04/87/00	MBR	EPA 7196	0.005
Lead	100	mg/L	04/11/00	MBR	EPA 6010	0.050
Metals Prep, Aqueous	04/07/00	date digested	, [- , ·	MBR	EPA 3010M	
Benzene	4.8	μg/L	04/12/00	BT	EPA 8260	1.0
Syn. Pcpt. Leaching Proc.	04/06/00	date extracted			BPA 1312	

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PAGE 03/03

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Sample ID: LBA-18

Lab ID: 0004047-04

Collected: 04/04/00

TEST	RESULT	UNITS	ANALYZED	BY	METHOD	RL
Hq	12.5	s.u.	04/06/00	WS	EPA 9040	0-14
Syn. Pcpt. Leaching Proc.	04/07/00	date extracted	04/07/00	WS	EPA 1312	
Chromium, Hexavalent	ND	mg/L	04/07/00	MBR	EPA 7196	0.005
Lead	סא	mg/L	04/11/00	MBR	EPA 6010	0.050
Metals Prep, Aqueous	04/07/00	date digested	•	MBR	EPA 3010M	
Benzene	2.7	μg/L	04/12/00	BT	EPA 8260	1.0
Syn. Pcpt. Leaching Proc.	04/06/00	date extracted	•	BÎ	EPA 1312	

cc: IT Group Corp. - Paul Lear

MICROSPEC ANALYTICAL GROUP, LTD.

Analytical Laboratory and Testing Services

3352 128th Avenue, Holland, Michigan 49424-9263

Phone: 616-399-6070 FAX: 616-399-6185

E-Wait; info@mspec.com Internet: http://www.mspec.com

CLIENT:

ERM, Inc. 355 E. Campus View Blvd. #250

Columbus, OR 43235

Attn: Susan Dragt

Lubrizol/Greiner's Lagoon Re:

DATE:

May 5, 2000

AMALYSIS OF:

Treated Soil Samples

REPORTED BY:

Laboratory Director

DATE RECEIVED:

Received from client on April 27, 2000.

Semple ID: LBB-28(B)

Lab ID: 0004334-01

Collected: 04/26/00

	result	UNITS	AMALTED	BY	METROD	RL
Syn. Pept. Leaching Proc.	12.3	S.U. date extracted	04/28/00 04/28/00	WS WS	EPA 9040 EPA 1312	0-14
Chromium, Hexavalent	0.12 •	mg/L	04/28/00	MBR	EPA 7196	0.005 0.050
:als Prep, Aqueous	0.77 05/01/00	mg/L date digested	05/01/00	mbr Ja	EPA 6010 EPA 3010H	0.030
Benzene Syn. Popt. Leaching Proc.	24 04/28/00	μg/L date extracted	05/02/00	DAH	EPA 8260 EPA 1312	1-0

Sample 1D: LBB-29(C)

Lab ID: 0004334-02

Collected: 04/26/00

Test	result	UNITS	ANALYSED	BY	METHOD	RL
•	12.3	s.u.	04/28/00	WS	EPA 9040	0-14
a. Popt. Leaching Proc.	04/28/00	date extracted	04/28/00	WS	EPA 1312	
Chromium, Hexavalent	0.11 •	mg/L	04/28/00	MBR	EPA 7196	0.005
Lead	0.99	mq/L	05/01/00	KBR	EPA 6010	0.05
Metals Prep, Aqueous	05/01/00	date digested	• •	JA	EPA 3010H	
Senzene	36	µq/L	05/03/00	DAH	EPA 8260	1.0
Syn. Pcpt. Leaching Proc.	04/28/00	date extracted		BT	EPA 1312	

Sample ID: LBB-30(D)

Lab ID: 0004334-03

Collected: 04/26/00

TEST	result	UNITS	VMYTA 1ED	BY	METROD	RT.
pfi	12.3	s.u.	04/28/00	WS	EPA 9040	0-14
Syn. Pcpt. Leaching Proc.	04/28/00	date extracted	04/28/00	WS	EPA 1312	
Chromium, Hexavalent	0.12 •	mq/L	04/28/00	MBR	EPA 7196	0.005
Lead	0.78	mq/L	05/01/00	MBR	EPA 6010	0.050
Metals Prep, Aqueous	05/01/00	date digested	,,	JA	EPA 3010M	
Benzene	110	μg/Σ	05/03/00	DAH	EPA 8260	1.0
Syn. Popt. Leaching Proc.	04/28/00	date extracted	,,	BT	EPA 1312	

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le ID: LBB-32(F)

Lab ID: 0004334-04

Collected: 04/26/00

TEST	RESULT	UNITS	ANALYZED	BX	METBOD	RL.
рн	12.2	g.u.	04/28/00	WS	EPA 9040	0-14
Syn, Popt. Leaching Proc.	04/28/00	date extracted	04/28/00	ws	EPA 1312	
Chromium, Hexavalent	0.11 *	mg/L	04/28/00	MER	EPA 7196	0.005
Lead	0.45	mg/L	05/01/00	MBR	EPA 6010	0.050
Metals Prep, Aqueous	05/01/00	date digested	•	JA	EPA 3010M	
Benzene	110	μg/L	05/02/00	DAH	EPA 8260	1.0
Syn. Popt. Leaching Proc.	04/28/00	date extracted		BT	EPA 1312	

* = Low spike recoveries were experienced for the hexavalent chromium analyses.

It is suspected that the treatment applied to the soils is influencing the spike recovery results.

IT Group - Paul Lear

Analytical Laboratory and Testing Services

MICROSPEC ANALYTICAL GROUP, LTD. 3352 128th Avenue, Holland, Michigan 49424-9263 Phone: 616-399-6070 FAX: 616-399-6185 E-Wait info@mspec.com Internet: http://www.mspec.com

CLIENT:

ERM, Inc.

355 E. Campus View Blvd. #250

Columbus, OH 43235

Attn: Susan Dragt

Re: Lubrizol/Greiner's Lagoon

DATE:

May 5, 2000

MUNLYSIS OF:

Treated Soil Sample

REPORTED BY:

DATE RECEIVED:

Received from client on April 28, 2000.

.e ID: LB8-31 (2)

Lab ID: 0004353-01

Collected: 04/25/00

						
TREE	result	Units	MALYSED	BY	METROD	RL
pfi	12.4	s.u.	05/02/00	WS	EPA 9040	0-14
Syn. Pept. Leaching Proc.	05/02/00	date extracted	05/02/00	WS	EPA 1312	
omium, Hexavalent	0.049 •	mg/L	05/02/00	MBR	EPA 7196	0.005
A	1.6	= g/L	05/04/00	MBR	EPA 6010	0.050
Metals Prep, Aqueous	05/03/00	date digested	• •	JA	EPA 3010H	
Benzene	110	µg/L	05/02/00	DAH	EPA 8260	1.0
Syn. Pcpt. Leaching Proc.	05/01/00	date extracted	•	BAT	BPA 1312	

⁼ Low spike recoveries were experienced for the hexavalent chromium analyses. It is suspected that the treatment applied to the soils is influencing the spike recovery results.

cc: IT Group - Paul Lear



MICROSPEC ANALYTICAL GROUP, LTD.

Analytical Laboratory and Testing Services

3352 128th Avenue Holland, Michigan 49424-9263 Phone: 616-399-6070 FAX: 616-399-6185

E-Mail: info@mspec.com Internet: http://www.mspec.com

CLIENT:

ERM, Inc.

355 E. Campus View Blvd. #250

Columbus, OH 43235

Attn: Sue Dragt Re:

Lubrizol/Greiner's Lagoon

DATE:

May 30, 2000

ANALYSIS OF:

Treated Soil Samples

REPORTED BY:

Zahray, Laboratory Director

DATE RECEIVED:

Receivedd from IT Group on April 28, 2000.

Finale ID: LBA-26

Lab ID: 0005203-01

Collected: 05/16/00

est	result	UNITS	ANALYZED	BY	METHOD	RL
pH Syn. Pcpt. Leaching Proc.	12.5 05/18/00	5.u. date extracted	05/18/00 05/18/00	WS WS	EPA 9040 EPA 1312	0-14
Chromium, Hexavalent	0.021	mg/L	05/17/00	MBR	EPA 7196	0.005
Lead) is Prep, Aqueous	0.037 05/18/00	mg/L date digested	05/18/00	JA Ja	EPA 7421 EPA 3010M	0.0010
Lagrene	9.7	μ g/ L	05/18/00	HL	EPA 8260	1.0

Sample ID: LBA-27

Lab ID: 0005203-02

Collected: 05/16/00

	RESULT	UNITS	ANALY2ED	BY	METHOD	RL
off Syn. Popt. Leaching Proc. C' mium, Hexavalent Lieu Metals Prep, Aqueous Benzene	12.4 05/18/00 0.019 0.067 05/18/00 8.1	s.u. date extracted mg/L mg/L date digested µg/L	05/18/00 05/18/00 05/17/00 05/19/00 05/18/00	WS WS MBR JA JA HL	EPA 9040 EPA 1312 EPA 7196 EPA 7421 EPA 3010M EPA 8260	0-14 0.005 0.0010 1.0

IT Group - Paul Lear



Appendix B - Unconfined Compressive Strength Reports

Unconfined Compressive Strength ASTM D2166-85

Project:

ERM/Lubrizol

Sample Description:

LBA-2 (7days)

Analyst:

RGB

Date:

3/28/00

373.92

10.2

Sample Weight (g): Sample Diameter (cm):

Sample Volume (cm³):

5.0 200.28

Bulk Density (g/cm³):

Sample Height (cm):

1.87

Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)	2 4 444	(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
5	13	0.013	0.001	3.047	1.64
10	39	0.039	0.004	3.055	3.27
15	87	0.087	0.009	3.070	4.89
20	139	0.139	0.014	3.085	6.48
25	198	0.198	0.019	3.104	8.05
25.5	210	0.210	0.021	3.107	8.21

Unconfined Compressive Strength ASTM D2166-85

Project:

ERM Lubrizol

Sample Description:

LBA-2 (14days)

Analyst: RGB Date: 4/4/00

Sample Weight (g): 376.05 Sample Height (cm): 10.2

Sample Diameter (cm): 5.0

Sample Volume (cm³): 200.28 Bulk Density (g/cm³): 1.88

Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)		(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
10	9	0.009	0.001	3.046	3.28
20	21	0.021	0.002	3.050	6.56
30	60	0.060	0.006	3.061	9.80
35	90	0.090	0.009	3.071	11.40
40	120	0.120	0.017	3.080	12.99
45	154	0.154		3.090	14.56
50	195	0.195		3.103	16.11
51.4	215	0.215	J21	3.109	16.53

Unconfined Compressive Strength ASTM D2166-85

Project:

ERM/Lubrizol

Sample Description:

LBA-4 (7days)

Analyst:

RGB

Date:

3/28/00

Sample Weight (g): Sample Diameter (cm):

388.58

5.0

10.2

Sample Volume (cm³):

200.28

Bulk Density (g/cm³):

Sample Height (cm):

1.94

Load	Strain	Total	Unit Strain	Corrected	Stress
(lb)	(0.001 in)	Strain (in)	Strain	Area (in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
10	7	0.007	0.001	3.046	3.28
20	13	0.013	0.001	3.047	6.56
30	21	0.021	0.002	3.050	9.84
40	49	0.049	0.005	3.058	13.08
45	66	0.066	0.006	3.063	14.69
50	83	0.083	0.008	3.068	16.30
55	104	0.104	0.010	3.075	17.89
60	122	0.122	0.012	3.080	19.48
65	144	0.144	0.014	3.087	21.06
68.5	182	0.182	0.018	3.099	22.11

Project:

ERM/Lubrizol

Sample Description:

LBA-4 (14days)

Analyst:	RGB		Date:	4/4/00
Sample Weight (g): Sample Diameter (cm	n):	388.52 5.0	Sample Height (cm):	10.2
Sample Volume (cm'	^3):	200.28	Bulk Density (g/cm ³):	1.94

Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)	Jumi	(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
10	2	0.002	0.000	3.044	3.29
20	4	0.004	0.000	3.045	6.57
40	7	0.007	0.001	3.046	13.13
60	9	0.009	0.001	3.046	19.70
100	14	0.014	0.001	3.048	32.81
130	19	0.019	0.002	3.049	42.64
150	21	0.021	0.002	3.050	49.19
180	26	0.026	0.003	3.051	58.99
210	31	0.031	0.003	3.053	68.79
240	41	0.041	0.004	3.056	78.54
254.6	48	0.048	0.005	3.058	83.26

Project:

ERM/Lubrizol

Sample Description:

LBA-6 (7days)

Analyst:

RGB

Date:

3/28/00

382.99

Sample Weight (g): Sample Diameter (cm):

5.0

10.2

Sample Volume (cm³):

200.28

Bulk Density (g/cm³):

Sample Height (cm):

Load	Strain	Total	Unit	Corrected	Stress
(lb)	(0.001 in)	Strain (in)	Strain	Area (in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
10	27	0.027	0.003	3.052	3.28
20	74	0.074	0.007	3.066	6.52
25	98	0.098	0.010	3.073	8.14
30	120	0.120	0.012	3.080	9.74
35	144	0.144	0.014	3.087	11.34
40	168	0.168	0.016	3.094	12.93
43.6	205	0.205	0.020	3.106	14.04

Project:

ERM/Lubrizol

Sample Description:

LBA-6 (14days)

Analyst:	RGB		Date:	4/4/00
Sample Weight (g): Sample Diameter (cn	n):	374.29 5.0	Sample Height (cm):	10.1
Sample Volume (cm	^3):	198.31	Bulk Density (g/cm ³):	1.89

Load	Strain	Total	Unit	Corrected	Stress
(lb)	(0.001 in)	Strain (in)	Strain	Area (in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
10	15	0.015	0.001	3.048	3.28
20	33	0.033	0.003	3.053	6.55
30	63	0.063	0.006	3.063	9.80
40	98	0.098	0.010	3.073	13.02
50	132	0.132	0.013	3.084	16.21
58	185	r	.018	3.100	18.71

Project:

ERM/Lubrizol

112

126

Sample Description:

Sample Volume (cm³):

100

105

LBA-8 (7days)

200.28

0.112

0.126

Analyst:	RGB		Date:	3/28/00
Sample Weight (g): Sample Diameter (c		384.38 5.0	Sample Height (cm):	10.2

Bulk Density (g/cm³):

3.077

3.081

1.92

32.50

34.07

Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)	-	(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
10	5	0.005	0.000	3.045	3.28
20	13	0.013	0.001	3.047	6.56
30	24	0.024	0.002	3.051	9.83
40	32	0.032	0.003	3.053	13.10
50	43	0.043	0.004	3.056	16.36
60	55	0.055	0.005	3.060	19.61
70	66	0.066	0.006	3.063	22.85
80	80	0.080	0.008	3.067	26.08
90	94	0.094	0.009	3.072	29.30

0.011

Project:

ERM Lubrizol

Sample Description:

LBA-8 (14days)

Analyst: RGB		Date:	4/4/00	
Sample Weight (g): Sample Diameter (cm):	386.69 5.0	Sample Height (cm):	10.2	
Sample Volume (cm ³):	200.28	Bulk Density (g/cm^3):	1.93	

Load	Strain	Total Strain	Unit Strain	Corrected	Stress
(lb)	(0.001 in)	(in)	Strain	Area (in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
10	3	0.003	0.000	3.044	3.28
30	7	0.007	0.001	3.046	9.85
50	18	0.018	0.002	3.049	16.40
70	36	0.036	0.004	3.054	22.92
90	58	0.058	0.006	3.061	29.40
110	82	0.082	0.008	3.068	35.85
120	95	0.095	0.009	3.072	39.06
130	108	0.108	0.011	3.076	42.26
140	124	0.124	0.012	3.081	45.44
	140	0.140	0.014	3.086	46.50

Project:

ERM/Lubrizol

Sample Description:

LBA-10 (7days)

Analyst:

RGB

Date:

3/28/00

Sample Weight (g):

360.47

Sample Height (cm):

9.6

Sample Diameter (cm):

Sample Volume (cm³):

5.0

188.50

Bulk Density (g/cm³):

			~~~~~~~~~~~		
Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)		(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
10	8	0.008	0.001	3.046	3.28
20	21	0.021	0.002	3.050	6.56
40	36	0.036	0.004	3.055	13.09
60	45	0.045	0.005	3.058	19.62
80	57	0.057	0.006	3.062	26.13
100	70	0.070	0.007	3.066	32.62
120	83	0.083	0.009	3.070	39.09
127.6	100	0.100	0.010	3.075	41.49

Project:

ERM/Lubrizol

20

27

39

54

68

Sample Description:

70

100

130

150

154.8

LBA-10 (14days)

Analyst:	RGB			Date:	4/4/00
Sample Weight (g) Sample Diameter (d		3 <b>8</b> 0.96 5.0	Sample Height (cm):		10.2
Sample Volume (cr	n^3):	200.28	Bulk Density (g/cm ³ ):		1.90
Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)		(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
10	4	0.004	0.000	3.045	3.28
30	10	0.010	0.001	3.046	9.85
50	16	0.016	0.002	3.048	16.40

0.002

0.003

0.004

0.005

0.007

3.049

3.052

3.055

3.060

3.064

22.96

32.77

42.55 49.03

50.52

0.020

0.027

0.039

0.054

Project:

ERM/Lubrizol

Sample Description:

LBA-15 (7days)

Analyst:

**RGB** 

Date:

3/28/00

Sample Weight (g):

391.17

Sample Height (cm):

10.2

Sample Diameter (cm):

5.0

Sample Volume (cm³):

200.28

Bulk Density (g/cm³):

	~				
Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)		(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
10	2	0.002	0.000	3.044	3.29
30	6	0.006	0.001	3.045	9.85
70	11	0.011	0.001	3.047	22.98
90	15	0.015	0.001	3.048	29.53
120	20	0.020	0.002	3.049	39.35
150	25	0.025	0.002	3.051	49.17
180	34	0.034	0.003	3.054	58.95
200	47	0.047	0.005	3.058	65.41
209	70	0.070	0.007	3.064	68.20

Project:

ERM Lubrizol

Sample Description:

LBA-18 (7days)

Analyst:	RGB		Date:	3/28/00
Sample Weight (g): Sample Diameter (cn	n):	402.34 5.0	Sample Height (cm):	10.2
Sample Volume (cm	^3):	200.28	Bulk Density (g/cm^3):	2.01

Load	Strain	Total	Unit	Corrected	Stress
(lb)	(0.001 in)	Strain (in)	Strain	Area (in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
30	1	0.001	0.000	3.044	9.86
60	2	0.002	0.000	3.044	19.71
100	5	0.005	0.000	3.045	32.84
ں.	7	0.007	0.001	3.046	42.69
160	10	0.010	0.001	3.046	52.52
190	15	0.015	0.001	3.048	62.34
220	20	0.020	0.002	3.049	72.15
250	28	0.028	0.003	3.052	81.92
278.6	55	0.055	0.005	3.060	91.05

Project:

ERM/Lubrizol

Sample Description:

LBA-19 (7days)

Analyst:

**RGB** 

Date:

3/28/00

364.16

Sample Height (cm):

10.2

Sample Weight (g): Sample Diameter (cm):

5.0

Sample Volume (cm³):

200.28

Bulk Density (g/cm³):

Load	Strain	Total	Unit	Corrected	Stress
(lb)	(0.001 in)	Strain (in)	Strain	Area (in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
1	10	0.010	0.001	3.046	0.33
2	20	0.020	0.002	3.049	0.66
5	65	0.065	0.006	3.063	1.63
7	93	0.093	0.009	3.071	2.28
9	122	0.122	0.012	3.080	2.92
11	143	0.143	0.014	3.087	3.56
13	170	0.170	0.017	3.095	4.20
15	193	0.193	0.019	3.102	4.84
17	218	0.218	0.021	3.110	5.47
18	230	0.230	0.023	3.114	5.78
20	258	0.258	0.025	3.122	6.41
21	273	0.273	0.027	3.127	6.72
22	290	0.290	0.028	3.132	7.02
22.3	300	0.300	0.029	3.136	7.11

Project:

ERM/Lubrizol

Sample Description:

LBA-19 (14days)

Analyst: RGB		Date:	4/4/00
Sample Weight (g): Sample Diameter (cm):	361.00 5.0	Sample Height (cm):	10.1
Sample Volume (cm ³ ):	198.31	Bulk Density (g/cm ³ ):	1.82

Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)	Suum	(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
3	24	0.024	0.002	3.051	0.98
6	66	0.066	0.007	3.063	1.96
9	108	0.108	0.011	3.076	2.93
12	142	0.142	0.014	3.087	3.89
15	175	0.175	0.017	3.097	4.84
18	208	0.208	0.021	3.107	5.79
3.	238	0.238	0.024	3.117	6.74
•	285	0.285	0.028	3.132	7.66
24.4	300	0.300	0.030	3.137	7.78

Project:

ERM/Lubrizol

Sample Description:

LBA-24 (7days)

Analyst:

RGB

Date:

3/28/00

332.82

10.2

Sample Weight (g): Sample Diameter (cm):

5.0

Sample Height (cm):

Sample Volume (cm³):

200.28

Bulk Density (g/cm³):

			************			~~~~~
,	Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
	(lb)	(0.001 in)	(in)	Suam	(in^2)	(psi)
	0	0	0.000	0.000	3.043	0.00
	10	2	0.002	0.000	3.044	3.29
	30	10	0.010	0.001	3.046	9.85
	50	21	0.021	0.002	3.050	16.40
	57	34	0.034	0.003	3.054	18.67

Project:

ERM/Lubrizol

Sample Description:

LBA-24 (14days)

 Analyst:
 RGB
 Date:
 4/4/00

 Sample Weight (g):
 334.19
 Sample Height (cm):
 10.2

 Sample Diameter (cm):
 5.0
 5.0

 Sample Volume (cm^3):
 200.28
 Bulk Density (g/cm^3):
 1.67

Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress	
(lb)	(0.001 in)	(in)	Suam	(in^2)	(psi)	
0	0	0.000	0.000	3.043	0.00	
10	4	0.004	0.000	3.045	3.28	
20	7	0.007	0.001	3.046	6.57	
40	12	0.012	0.001	3.047	13.13	
60	19	0.019	0.002	3.049	19.68	
62	23	0.023	0.002	3.050	20.33	

Project:

ERM/Lubrizol

Sample Description:

LBA 25 7 days

Analyst:

**RGB** 

Date:

5/5/00

376.18

10.2

Sample Weight (g): Sample Diameter (cm):

5.0

Sample Height (cm):

Sample Volume (cm³):

200.28

Bulk Density (g/cm³):

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	Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
	(lb)	(0.001 in)	(in)	Signi	(in^2)	(psi)
	0	0	0.000	0.000	3.043	0.00
	5	4	0.004	0.000	3.045	1.64
	10	21	0.021	0.002	3.050	3.28
	15	58	0.058	0.006	3.061	4.90
	20	100	0.100	0.010	3.074	6.51
	25	141	0.141	r	3.086	8.10
	30	188	0.188		3.101	9.68
	34.2	238	0.238	23ن.	3.116	10.98

Project:

ERM/Lubrizol

Sample Description:

LBA 25 14 days

Analyst: RGB		Date:	5/12/00
Sample Weight (g): Sample Diameter (cm):	377.42 5.0	Sample Height (cm):	10.2
Sample Volume (cm ³ ):	200.28	Bulk Density (g/cm ³ ):	1.88

Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress	
(lb)	(0.001 in)	(in)	<del></del>	(in^2)	(psi)	
0	0	0.000	0.000	3.043	0.00	
10	9	0.009	0.001	3.046	3.28	
20	27	0.027	0.003	3.052	6.55	
30	74	0.074	0.007	3.066	9.79	
40	129	0.129	0.013	3.082	12.98	
50	206	0.206	0.020	3.106	16.10	
50.2	220	0.220	0.022	3.111	16.14	

Project:

ERM/Lubrizol

Sample Description:

LBA 26 7 days

Analyst: RGB Date: 5/5/00

Sample Weight (g): 387.75 Sample Height (cm): 10.2

Sample Diameter (cm): 5.0

Sample Diameter (cm).

Sample Volume (cm³): 200.28 Bulk Density (g/cm³): 1.94

Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)	Stam	(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
40	1	0.001	0.000	3.044	13.14
70	6	0.006	0.001	3.045	22.99
90	· 9	0.009	0.001	3.046	29.55
120	15	0.015	0.001	3.048	39.37
150	33	0.033	0.00°	3.053	49.13
160.2	65	0.065	•	3.063	52.30

Project:

ERM/Lubrizol

Sample Description:

LBA 26 14 days

Analyst:

**RGB** 

Date:

5/12/00

Sample Weight (g):

387.95

10.2

Sample Diameter (cm):

5.0

10.2

Sample Volume (cm³):

200.28

Bulk Density (g/cm³):

Sample Height (cm):

Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)	Sumi	(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
30	2	0.002	0.000	3.044	9.86
60	7	0.007	0.001	3.046	19.70
90	13	0.013	0.001	3.047	29.53
120	19	0.019	0.002	3.049	39.36
150	27	0.027	0.003	3.052	49.16
180	40	0.040	0.004	3.055	58.91
197	75	0.075	0.007	3.066	64.25

Project:

ERM/Lubrizol

Sample Description:

LBA 27 7 days

Analyst:

RGB

Date:

5/5/00

383.69

Sample Height (cm):

10.2

Sample Weight (g): Sample Diameter (cm):

5.0

Sample Volume (cm³):

200.28

Bulk Density (g/cm³):

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Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)	Stani	(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
10	3	0.003	0.000	3.044	3.28
30	34	0.034	0.003	3.054	9.82
40	64	0.064	0.006	3.063	13.06
50	97	0.097	0.010	3.073	16.27
60	134	0.134	0.013	3.084	19.46
63.7	175	0.175	0.017	3.097	20.57

Project:

ERM Lubrizol

Sample Description:

LBA 27 14 days

Analyst: RGB Date: 5/12/00

Sample Weight (g): 380.87 Sample Height (cm): 10.2

Sample Diameter (cm): 5.0

Sample Volume (cm³): 200.28 Bulk Density (g/cm³): 1.90

Load	Strain	Total	Unit	Corrected	Stress
(lb)	(0.001 in)	Strain (in)	Strain	Area (in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
20	2	0.002	0.000	3.044	6.57
60	5	0.005	0.000	3.045	19.70
90	10	0.010	0.001	3.046	29.54
120	15	0.015	0.001	3.048	39.37
150	20	0.020	0.002	3.049	49.19
180	26	0.026	0.003	3.051	58.99
210	35	0.035	0.003	3.054	68.76
225.3	55	0.055	0.005	3.060	73.63

Project:

ERM/Lubrizol

Sample Description:

LBA 28 7 days

Analyst:

RGB

Date:

5/5/00

384.00

Sample Height (cm):

10.2

Sample Weight (g): Sample Diameter (cm):

5.0

1.92

Sample Volume (cm³):

200.28

Bulk Density (g/cm³):

	Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
	(lb)	(0.001 in)	(in)	Sudin	(in^2)	(psi)
•	0	0	0.000	0.000	3.043	0.00
	10	7	0.007	0.001	3.046	3.28
	20	20	0.020	0.002	3.049	6.56
	30	35	0.035	0.003	3.054	9.82
	· 40	55	0.055	0.005	3.060	13.07
	50	75	0.075	0.007	3.066	16.31
	60	99	0.099	0.010	3.073	19.52
	69.3	140	0.140	0.014	3.086	22.46

Project:

ERM/Lubrizol

Sample Description:

LBA 28 14 days

 Analyst:
 RGB
 Date:
 5/12/00

 Sample Weight (g):
 380.75
 Sample Height (cm):
 10.2

 Sample Diameter (cm):
 5.0
 10.2

 Sample Volume (cm^3):
 200.28
 Bulk Density (g/cm^3):
 1.90

Load	Strain	Total Strain	Unit Strain	Corrected	Stress
(lb)	(0.001 in)	(in)	Suam	Area (in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
10	5	0.005	0.000	3.045	3.28
30	8	0.008	0.001	3.046	9.85
60	15	0.015	0.001	3.048	19.69
90	40	0.040	0.004	3.055	29.46
104	78	0.078	0.008	3.067	33.91

Project:

ERM/Lubrizol

Sample Description:

LBB-2 (7days)

Analyst:

**RGB** 

Date:

3/28/00

Sample Weight (g):

355.08

Sample Diameter (cm):

5.0

Sample Volume (cm³):

200.28

Bulk Density (g/cm³):

Sample Height (cm):

1.77

10.2

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Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)		(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00

Sample broke during demolding. Very wet and soft.

Project:

ERM/Lubrizol

Sample Description:

LBB-2 (14days)

Analyst:

RGB

Date:

4/4/00

Sample Weight (g):

352.67

200.28

Sample Height (cm):

10.2

Sample Diameter (cm):

Sample Volume (cm³):

5.0

Bulk Density (g/cm³):

Load	Strain	Total	Unit	Corrected	Stress
		Strain	Strain	Area	
(lb)	(0.001 in)	(in)		(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00

Project:

ERM/Lubrizol

Sample Description:

LBB-4 (7days)

Analyst:

**RGB** 

Date:

3/28/00

375.55

Sample Weight (g): Sample Diameter (cm):

5.0

10.2

Sample Volume (cm³):

200.28

Bulk Density (g/cm³):

Sample Height (cm):

Loa	d Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)	Stani	(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
5	11	0.011	0.001	3.047	1.64
10	26	0.026	0.003	3.051	3.28
15	45	0.045	0.004	3.057	4.91
20	74	0.074	0.007	3.066	6.52
٠.	100	0.100	0.010	3.074	7.00

Project:

**ERM** Lubrizol

Sample Description:

LBB-4 (14days)

Analyst:

**RGB** 

Date:

4/4/00

Sample Weight (g):

381.87

Sample Height (cm):

10.2

Sample Diameter (cm):

Sample Volume (cm³):

5.0

200.28

Bulk Density (g/cm³):

Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)	Jum	(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
10	18	0.018	0.002	3.049	3.28
20	47	0.047	0.005	3.058	6.54
30	98	0.098	0.010	3.073	9.76
31.7	127	0.127	0.012	3.082	10.29

Project:

ERM/Lubrizol

Sample Description:

LBB-6 (7days)

Analyst: RGB		Date:	3/28/00
Sample Weight (g): Sample Diameter (cm):	370.84 5.0	Sample Height (cm):	10.2
Sample Volume (cm ³ ):	200.28	Bulk Density (g/cm^3):	1.85

Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)	Stram	(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
5	12	0.012	0.001	3.047	1.64
10	28	0.028	0.003	3.052	3.28
15	47	0.047	0.005	3.058	4.91
20	70	0.070	0.007	3.064	6.53
24.4	120	0.120	0.012	3.080	7.92

Project:

ERM/Lubrizol

Sample Description:

LBB-6 (14days)

Analyst:	RGB		Date:	4/4/00
Sample Weight (g): Sample Diameter (co		36 <b>8</b> .43 5.0	Sample Height (cm):	10.2
Sample Volume (cm ³ ):		200.28	Bulk Density (g/cm^3):	1.84
•		T . 1		

Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)		(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
10	20	0.020	0.002	3.049	3.28
20	62	0.062	0.006	3.062	6.53
22.8	100	0.100	0.010	3.074	7.42

Project:

ERM/Lubrizol

Sample Description:

LBB-8 (7days)

Analyst:

**RGB** 

Date:

3/28/00

368.81

10.2

Sample Weight (g): Sample Diameter (cm):

5.0

Sample Volume (cm³):

200.28

Bulk Density (g/cm³):

Sample Height (cm):

				*******	
Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)		(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
10	12	0.012	0.001	3.047	3.28
20	42	0.042	0.004	3.056	6.54
24	70	0.070	0.007	3.064	7.83

Project:

**ERM Lubrizol** 

Sample Description:

LBB-8 (14days)

Analyst:

**RGB** 

Date:

4/4/00

Sample Weight (g):

369.48

Sample Height (cm):

10.2

Sample Diameter (cm):

5.0

Sample Volume (cm³):

200.28

Bulk Density (g/cm³):

Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)	Suam	(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
10	12	0.012	0.001	3.047	3.28
20	33	0.033	0.003	3.053	6.55
25	46	0.046	0.005	3.057	8.18
30	62	0.062	0.006	3.062	9.80
35	80	0.080	0.008	3.067	11.41
39.6	110	0.110	0.011	3 077	12 87

Project:

ERM/Lubrizol

Sample Description:

LBB-10 (7days)

Analyst:

**RGB** 

Date:

3/28/00

Sample Weight (g):

368.37

Sample Height (cm):

10.2

Sample Diameter (cm):

Sample Volume (cm³):

5.0 200.28

Bulk Density (g/cm³):

Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)	Suam	(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
10	17	0.017	0.002	3.049	3.28
15	30	0.030	0.003	3.052	4.91
20	48	0.048	0.005	3.058	6.54
7 *	69	0.069	~	3.064	8.16
				3 069	8 93

Project:

ERM/Lubrizol

Sample Description:

LBB-10 (14days)

Analyst:

**RGB** 

Date:

4/4/00

Sample Weight (g):

364.67

Sample Height (cm):

10.2

Sample Diameter (cm):

5.0

10.2

Sample Volume (cm³):

200.28

Bulk Density (g/cm³):

Load	Strain	Total	Unit	Corrected	Stress
(lb)	(0.001 in)	Strain (in)	Strain	Area (in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
10	7	0.007	0.001	3.046	3.28
20	24	0.024	0.002	3.051	6.56
25	35	0.035	0.003	3.054	8.19
30	48	0.048	0.005	3.058	9.81
35	68	0.068	0.007	3.064	11.42
37	88	0.088	0.009	3.070	12.05

Project:

ERM/Lubrizol

Sample Description:

LBB-15 (7days)

Analyst:

**RGB** 

Date:

3/28/00

Sample Weight (g):

374.77

Sample Height (cm):

10.2

Sample Diameter (cm):

Sample Volume (cm³):

5.0 200.28

Bulk Density (g/cm³):

Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)	Strain	(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
5	14	0.014	0.001	3.048	1.64
10	41	0.041	0.004	3.056	3.27
15	83	0.083	0.008	3.068	4.89
15.4	100	0.100	0.010	3.074	5.01

Project:

**ERM** Lubrizol

Sample Description:

LBB-14 (14days)

Analyst:

**RGB** 

4/4/00

Sample Weight (g):

371.37

Sample Height (cm):

10.2

Sample Diameter (cm):

5.0

Date:

Sample Volume (cm³):

200.28

Bulk Density (g/cm³):

	*****					٠
Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress	
(lb)	(0.001 in)	(in)	Stant	(in^2)	(psi)	
0	0	0.000	0.000	3.043	0.00	
10	19	0.019	0.002	3.049	3.28	
20	57	0.057	0.006	3.061	6.53	
25	85	0.085	0.008	3.069	8.15	
27	112	0.112	0.011	3.077	8.77	

Project:

ERM/Lubrizol

Sample Description:

LBB-18 (7days)

Analyst:

RGB

Sample Height (cm):

Date:

3/28/00

Sample Weight (g):

386.36

Sample Diameter (cm):

5.0

10.2

Sample Volume (cm³):

200.28

Bulk Density (g/cm³):

Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)	Stan	(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
10	5	0.005	0.000	3.045	3.28
20	17	0.017	0.002	3.049	6.56
30	36	0.036	0.004	3.054	9.82
40	60	0.060	0.006	3.061	13.07
50	93	0.093	0.009	3.071	16.28
51.3	105	0.105	0.010	3.075	16.68

Project:

ERM/Lubrizol

Sample Description:

LBB-18 (14days)

Analyst:

**RGB** 

Date:

4/4/00

Sample Weight (g):

383.51

Sample Height (cm):

10.2

Sample Diameter (cm):

5.0

Sample Volume (cm³):

200.28

Bulk Density (g/cm³):

Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)		(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
10	9	0.009	0.001	3.046	3.28
20	15	0.015	0.001	3.048	6.56
30	25	0.025	0.002	3.051	9.83
40	37	0.037	0.004	3.055	13.10
50	57	0.057	0.006	3.061	16.34
55.4	<b>8</b> 5	0.085	0.008	3.069	18.05

Project:

ERM/Lubrizol

Sample Description:

LBB-19 (7days)

Analyst:

RGB

Date:

3/28/00

361.73

Sample Height (cm):

10.2

Sample Weight (g): Sample Diameter (cm):

5.0

Sample Volume (cm³):

200.28

Bulk Density (g/cm³):

Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)		(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
5	5	0.005	0.000	3.045	1.64
10	19	0.019	0.002	3.049	3.28
15	38	0.038	0.004	3.055	4.91
20	67	0.067	0.007	3.064	6.53
22.5	97	0.097	0.010	3.073	7.32

Project:

ERM/Lubrizol

Sample Description:

LBB-19 (14days)

 Analyst:
 RGB
 Date:
 4/4/00

 Sample Weight (g):
 349.60
 Sample Height (cm):
 10.2

Sample Diameter (cm): 5.0

Sample Volume (cm³): 200.28 Bulk Density (g/cm³): 1.75

Load	Strain	Total	Unit	Corrected	Stress	
(lb)	(0.001 in)	Strain (in)	Strain	Area (in^2)	(psi)	
0	0	0.000	0.000	3.043	0.00	
10	16	0.016	0.002	3.048	3.28	
17	43	0.043	0.004	3.056	5.56	
18.6	68	0.068	0.007	3.064	6.07	

Project:

ERM/Lubrizol

Sample Description:

LBB-24 (7days)

Analyst:

RGB

Date:

3/28/00

319.36

10.2

Sample Weight (g): Sample Diameter (cm):

5.0

Sample Volume (cm³):

200.28

Bulk Density (g/cm³):

Sample Height (cm):

Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress	
(lb)	(0.001 in)		Strain	(in^2)	(psi)	
0	0	0.000	0.000	3.043	0.00	
5	3	0.003	0.000	3.044	1.64	
10	7	0.007	0.001	3.046	3.28	
15	13	0.013	0.001	3.047	4.92	
20	17	0.017	0.002	3.049	6.56	
23.4	25	0.025	0.002	3 051	7 67	

Project:

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ERM/Lubrizol

Sample Description:

LBB-24 (14days)

Analyst: **RGB** 4/4/00 Date: Sample Weight (g): 315.33 Sample Height (cm): 10.2 Sample Diameter (cm): 5.0

Sample Volume (cm³): Bulk Density (g/cm³): 200.28 1.57

Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)		(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
10	4	0.004	0.000	3.045	3.28
20	13	0.013	0.001	3.047	6.56
25.7	25	0.025	0.002	3.051	8.42

Project:

ERM/Lubrizol

Sample Description:

LBB-25 (5days)

Analyst: RGB		Date:	4/4/00
Sample Weight (g): Sample Diameter (cm):	369.16 5.0	Sample Height (cm):	10.2
Sample Volume (cm^3):	200.28	Bulk Density (g/cm^3):	1.84

Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)	<b>5</b>	(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
10	2	0.002	0.000	3.044	3.29
30	7	0.007	0.001	3.046	9.85
50	11	0.011	0.001	3.047	16.41
70	15	0.015	0.001	3.048	22.97
90	18	0.018	0.002	3.049	29.52
120	25	0.025	0.002	3.051	39.33
150	32	0.032	0.003	3.053	49.13
180	37	0.037	0.004	3.055	58.93
200	46	0.046	0.005	3.057	65.42
220	57	0.057	0.006	3.061	71.88
226	75	0.075	0.007	3.066	73.71

Project:

ERM/Lubrizol

Sample Description:

LBB-26 (5days)

Analyst:

**RGB** 

Date:

4/4/00

Sample Weight (g):

335.82

Sample Height (cm):

10.2

Sample Diameter (cm):

5.0

Sample Volume (cm³):

200.28

Bulk Density (g/cm³):

Load	Strain	Total	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	Strain (in)	Strain	(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
10	6	0.006	0.001	3.045	3.28
20	17	0.017	0.002	3.049	6.56
30	36	0.036	0.004	3.054	9.82
33	53	0.053	0.005	3.059	10.79
33.5	66	0.066	0.006	3.063	10.94

Project:

ERM/Lubrizol

Sample Description:

LBB 27 (A) 7 days

Analyst: RGB Date: 4/18/00

Sample Weight (g): 361.92 Sample Height (cm): 10.2

Sample Diameter (cm): 5.0

Sample Volume (cm^3): 200.28 Bulk Density (g/cm^3): 1.81

Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)	<b>-</b>	(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
10	1	0.001	0.000	3.044	3.29
30	2	0.002	0.000	3.044	9.86
50	4	0.004	0.000	3.045	16.42
70	5	0.005	0.000	3.045	22.99
100	8	0.008	0.001	3.046	32.83
130	10	0.010	0.001	3.046	42.67
160	13	0.013	0.001	3.047	52.51
190	16	0.016	0.002	3.048	62.33
220	18	0.018	0.002	3.049	72.16
250	24	0.024	0.002	3.051	81.95
280	29	0.029	0.003	3.052	91.74
310	40	0.040	0.004	3.055	101.46
325.6	58	0.058	0.006	3.061	106.38

Project:

ERM/Lubrizol

Sample Description:

LBB 28 (B) 7 days

Analyst:	RGB		Date:	4/18/00
Sample Weight (g): Sample Diameter (cm	1):	356.38 5.0	Sample Height (cm):	10.2
Sample Volume (cm'	`3):	200.28	Bulk Density (g/cm^3):	1.78

Load	Strain	Total	Unit	Corrected	Stress
(lb)	(0.001 in)	Strain (in)	Strain	Area (in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
10	2	0.002	0.000	3.044	3.29
30	8	0.008	0.001	3.046	9.85
50	12	0.012	0.001	3.047	16.41
70	15	0.015	0.001	3.048	22.97
100	21	0.021	0.002	3.050	32.79
130	27	0.027	0.003	3.052	42.60
150	32	0.032	0.003	3.053	49.13
180	44	0.044	0.004	3.057	58.89
208.2	75	0.075	0.007	3.066	67.91

Project:

ERM/Lubrizol

Sample Description:

LBB 29 (C) 7 days

Analyst:

**RGB** 

Date:

4/18/00

Sample Weight (g):

360.72

Sample Height (cm):

10.2

Sample Diameter (cm):

5.0

Sample Volume (cm³):

200.28

Bulk Density (g/cm³):

1.80 •

Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress	
(lb)	(0.001 in)	(in)	oddii	(in^2)	(psi)	
0	0	0.000	0.000	3.043	0.00	
20	3	0.003	0.000	3.044	6.57	
50	8	0.008	0.001	3.046	16.42	
80	12	0.012	0.001	3.047	26.26	
110	15	0.015	0.001	3.048	36.09	
130	18	0.018	0.002	3.049	42.64	
160	22	0.022	0.002	3.050	52.46	
190	30	0.030	0.003	3.052	62.25	
220	44	0.044	0.004	3.057	71.98	
230	58	0.058	0.006	3.061	75.14	
231.8	65	0.065	0.006	3.063	75.68	

Project:

ERM/Lubrizol

Sample Description:

LBB 30 (D) 7 days

Analyst: RGB

Date: 4/18/00

Sample Weight (g): 353.39 Sample Height (cm): 10.2

Sample Diameter (cm): 5.0

Sample Volume (cm^3): 200.28 Bulk Density (g/cm^3): 1.76

Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)	Suam	(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
10	18	0.018	0.002	3.049	3.28
20	22	0.022	0.002	3.050	6.56
30	26	0.026	0.003	3.051	9.83
50	34	0.034	0.003	3.054	16.37
70	43	0.043	0.004	3.056	22.90
90	53	0.053	0.005	3.059	29.42
120	72	0.072	0.007	3.065	39.15
140	100	0.100	0.010	3.074	45.55
141.7	115	0.115	0.011	3.078	46.03

Project:

ERM/Lubrizol

Sample Description:

LBB 30 (D) 14 days

Analyst:

**RGB** 

Date:

4/25/00

353.19

Sample Height (cm):

10.2

Sample Weight (g): Sample Diameter (cm):

5.0

Sample Volume (cm³):

200.28

Bulk Density (g/cm³):

Load	Strain	Total	Unit	Corrected	Stress (psi)	
(lb)	(0.001 in)	Strain (in)	Strain	Area (in^2)		
0	0	0.000	0.000	3.043	0.00	
10	3	0.003	0.000	3.044	3.28	
30	12	0.012	0.001	3.047	9.85	
50	19	0.019	0.002	3.049	16.40	
70	26	0.026	0.003	3.051	22.94	
90	32	0.032	0.003	3.053	29.48	
110	40	0.040	0.004	3,055	36.00	
130	50	0.050	0.005	3.058	42.51	
150	61	0.061	0.006	3.062	48.99	
168.8	90	0.090	0.009	3.071	54.97	

Project:

ERM/Lubrizol

Sample Description:

LBB 31 (E) 7 days

Analyst:

RGB

Date:

4/18/00

Sample Weight (g):

351.76

10.2

Sample Diameter (cm):

5.0

Sample Volume (cm³):

200.28

Bulk Density (g/cm³):

Sample Height (cm):

Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)	Juan	(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
10	2	0.002	0.000	3.044	3.29
30	8	0.008	0.001	3.046	9.85
50	15	0.015	0.001	3.048	16.40
70	22	0.022	0.002	3.050	22.95
90	30	0.030	0.003	3.052	29.48
110	40	0.040	0.004	3.055	36.00
130	59	0.059	0.006	3.061	42.47
138.7	80	0.080	0.008	3.067	45.22

Project:

ERM/Lubrizol

Sample Description:

LBB 31 (E) 14 days

Analyst:	RGB		Date:	4/25/00
Sample Weight (g): Sample Diameter (cn	n):	350.85 5.0	Sample Height (cm):	10.2
Sample Volume (cm	^3):	200.28	Bulk Density (g/cm^3):	1.75

Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)	Strain	(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
20	2	0.002	0.000	3.044	6.57
40	7	0.007	0.001	3.046	13.13
60	12	0.012	0.001	3.047	19.69
80	17	0.017	0.002	3.049	26.24
100	22	0.022	0.002	3.050	32.79
120	27	0.027	0.003	3.052	39.32
140	35	0.035	0.003	3.054	45.84
160	50	0.050	0.005	3.058	52.31
163.9	65	0.065	0.006	3.063	53.51

Project:

ERM/Lubrizol

Sample Description:

LBB 32 (F) 7 days

Analyst:

**RGB** 

Date:

4/18/00

Sample Weight (g):

367.09

Sample Height (cm):

10.2

Sample Diameter (cm):

5.0

Sample Volume (cm³):

200.28

Bulk Density (g/cm³):

Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lp)	(0.001 in)	(in)		(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
5	17	0.017	0.002	3.049	1.64
10	45	0.045	0.004	3.057	3.27
13.4	105	0.105	0.010	3.075	4.36

Project:

ERM/Lubrizol

Sample Description:

LBB 32 (F) 14 days

Analyst:

RGB

Date:

4/25/00

Sample Weight (g):

363.85 5.0 Sample Height (cm):

10.2

Sample Diameter (cm):

Sample Volume (cm³):

200.28

Bulk Density (g/cm³):

Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)	Suani	(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
10	3	0.003	0.000	3.044	3.28
30	. 8	0.008	0.001	3.046	9.85
50	12	0.012	0.001	3.047	16.41
70	18	0.018	0.002	3.049	22.96
90	23	0.023	0.002	3.050	29.51
110	28	0.028	0.003	3.052	36.04
130	37	0.037	0.004	3.055	42.56
150	47	0.047	0.005	3.058	49.06
170	64	0.064	0.006	3.063	55.51
177	80	0.080	0.008	3.067	57.70

Project:

ERM Lubrizol

Sample Description:

LBB 33 (G) 7 days

Analyst: RGB

Date: 4/18/00

Sample Weight (g): 369.24 Sample Height (cm): 10.2

Sample Diameter (cm): 5.0

Sample Volume (cm^3): 200.28 Bulk Density (g/cm^3): 1.84

			*********		
Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)	Suam	(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
5	3	0.003	0.000	3.044	1.64
10	6	0.006	0.001	3.045	3.28
20	18	0.018	0.002	3.049	6.56
29.9	75	0.075	0.007	3.066	9.75

Project:

ERM/Lubrizol

Sample Description:

LBB 33 (G) 14 days

Analyst:

**RGB** 

Date:

4/25/00

361.87

Sample Height (cm):

10.2

Sample Weight (g): Sample Diameter (cm):

5.0

Sample Volume (cm³):

200.28

Bulk Density (g/cm³):

				**************	
Load	Strain	Total	Unit Strain	Corrected	Stress
(lb)	(0.001 in)	Strain (in)	Suam	Area (in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
10	2	0.002	0.000	3.044	3.29
30	7	0.007	0.001	3.046	9.85
50	15	0.015	0.001	3.048	16.40
70	25	0.025	0.002	3.051	22.94
90	46	0.046	0.005	3.057	29.44
91	55	0.055	0.005	3.060	29.74

Project:

ERM/Lubrizol

Sample Description:

LBB 34 7 days

Analyst:

**RGB** 

Date:

5/5/00

Sample Weight (g):

369.47

10.2

Sample Diameter (cm):

5.0

Sample Volume (cm³):

200.28

Bulk Density (g/cm³):

Sample Height (cm):

_						
	Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
	(lb)	(0.001 in)	(in)	Suum	(in^2)	(psi)
•	0	0	0.000	0.000	3.043	0.00
	5	14	0.014	0.001	3.048	1.64
	10	33	0.033	0.003	3.053	3.28
	20	80	0.080	0.008	3.067	6.52
	24.1	117	0.117	0.011	3.079	7.83

Project:

ERM/Lubrizol

Sample Description:

LBB 34 14 days

Analyst: RGB		Date:	5/12/00
Sample Weight (g): Sample Diameter (cm):	363.30 5.0	Sample Height (cm):	10.1
Sample Volume (cm ³ ):	198.31	Bulk Density (g/cm ³ ):	1.83

Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)	<b></b>	(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
10	2	0.002	0.000	3.044	3.29
30	8	0.008	0.001	3.046	9.85
60	16	0.016	0.002	3.048	19.68
90	25	0.025	0.002	3.051	29.50
120	35	0.035	0.003	3.054	39.29
150	50	0.050	0.005	3.059	49.04
162.6	75	0.075	0.007	3.066	53.03

Project:

ERM/Lubrizol

Sample Description:

LBB 35 7 days

Analyst:

**RGB** 

Date:

5/5/00

Sample Weight (g):

357.80

Sample Diameter (cm):

5.0

10.2

Sample Volume (cm³):

200.28

Bulk Density (g/cm³):

Sample Height (cm):

Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)		(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
10	1	0.001	0.000	3.044	3.29
30	6	0.006	0.001	3.045	9.85
50	12	0.012	100.0	3.047	16.41
80	20	0.020	0.002	3.049	26.23
110	28	0.028	0.003	3.052	36.04
140	42	0.042	0.004	3.056	45.81
164.6	67	0.067	0.007	3.064	53.73

Project:

ERM/Lubrizol

Sample Description:

LBB 35 14 days

Analyst:

RGB

Date:

5/12/00

Sample Weight (g):

360.77

Sample Height (cm):

10.2

Sample Diameter (cm):

5.0

Sample Volume (cm³):

200.28

Bulk Density (g/cm³):

**************************************					***
Load	Strain	Total Strain	Unit Strain	Corrected Area	Stress
(lb)	(0.001 in)	(in)		(in^2)	(psi)
0	0	0.000	0.000	3.043	0.00
30	1	0.001	0.000	3.044	9.86
60	5	0.005	0.000	3.045	19.70
90	9	0.009	0.001	3.046	29.55
120	15	0.015	0.001	3.048	39.37
150	23	0.023	0.002	3.050	49.18
180	34	0.034	0.003	3.054	<b>58.95</b>
197.9	52	0.052	0.005	3.059	64.69



#### Appendix C - Permeability Reports



IT Corporation
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### HYDRAULIC CONDUCTIVITY / PERMEABILITY ASTM D 5084

PROJECT NAME:

PROJECT NO.

ERM / Lubrizol

806133.01000000

CLIENT SAMPLE NO.

LBA-4

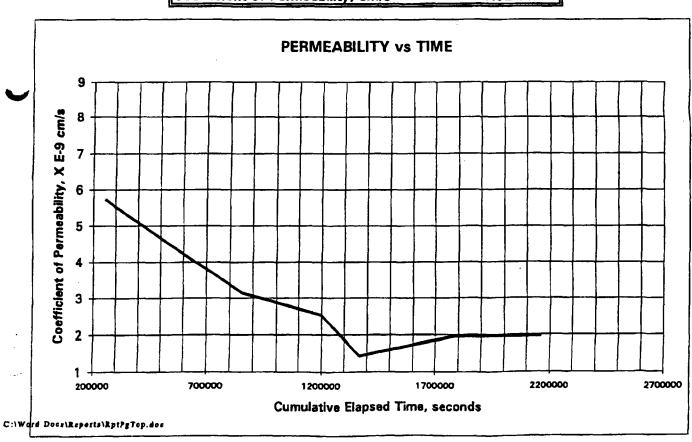
IT LAB SAMPLE NO.

ETDC-8682

	INITIAL	FINAL		·
Specimen diameter, cm	7.61			
Specimen length, cm	15.21		Hydraulic gradient	18.5
Wet weight of specimen, g.	1288.32	1314.72	Min. consolidation stress,	psí 2.0
Specimen cross-sect. area, cm ²	45.5277		Max. consolidation stress,	psi 10.0
Water content, %	20.3	22.7	Total backpressure, psi	6.0
Wet unit weight, pcf	116.2			
Dry unit weight, pcf	96.6		Permeant Fluid	Deaired DI Water
Estimated degree of saturation, %	75.4			
Estimated spec. gravity of solids	2.65		Specimen not saturated at	test close.

Coefficient of Permeability, cm/s

1.9E-09







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#### HYDRAULIC CONDUCTIVITY / PERMEABILITY **ASTM D 5084**

PROJECT NAME:

**ERM / Lubrizol** 

CLIENT SAMPLE NO.

**LBA-10** 

PROJECT NO.

806133.01000000

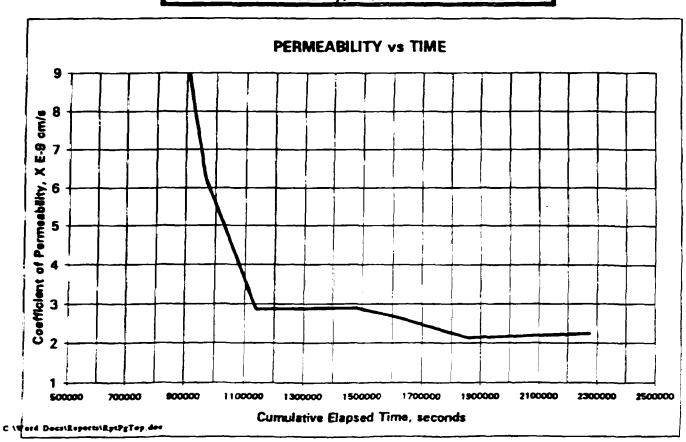
IT LAB SAMPLE NO.

ETDC-8683

	INITIAL	FINAL		
Specimen diameter, cm	7.61			
Specimen length, cm	15.21		Hydraulic gradient	18.5
Wet weight of specimen, g.	1297.89	1330.81	Min. consolidation stress,	psi 2.0
Specimen cross-sect. area, cm ²	45.5074		Max. consolidation stress,	psi 10.0
Water content, %	18.5	21.5	Total backpressure, psi	6.0
Wet unit weight, pcf	117.0			
Dry unit weight, pcf	98.8		Permeant Fluid	Deaired DI Water
Estimated degree of saturation, %	72.6			
Estimated spec. gravity of solids	2.65		Specimen not saturated at	test close.

Coefficient of Permeability, cm/s

2.5E-09





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### HYDRAULIC CONDUCTIVITY / PERMEABILITY ASTM D 5084

PROJECT NAME:

ERM / Lubrizol

CLIENT SAMPLE NO.

LBA-15

PROJECT NO.

806133.01000000

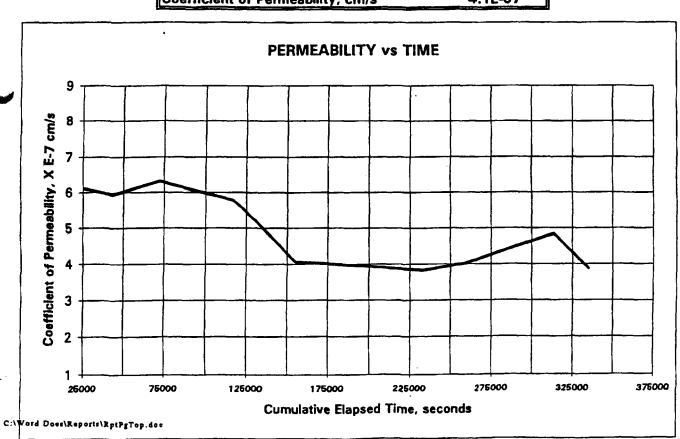
IT LAB SAMPLE NO.

**ETDC-8684** 

	INITIAL	FINAL	] .	
Specimen diameter, cm	7.63	<del></del>		
Specimen length, cm	15.20		Hydraulic gradient	18.5
Wet weight of specimen, g.	1301.12	1318.41	Min. consolidation stress, p	osi 2.0
Specimen cross-sect. area, cm ²	45.7660		Max. consolidation stress,	psi 6.0
Water content, %	22.1	23.8	Total backpressure, psi	6.0
Wet unit weight, pcf	116.8			
Dry unit weight, pcf	95.6		Permeant Fluid D	eaired DI Water
Estimated degree of saturation, %	80.3			
Estimated spec, gravity of solids	2.65		Specimen not saturated at	test close.

Coefficient of Permeability, cm/s

4.1E-07





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### HYDRAULIC CONDUCTIVITY / PERMEABILITY ASTM D 5084

PROJECT NAME:

ERM / Lubrizol

CLIENT SAMPLE NO.

LBA-18

PROJECT NO.

806133.01000000

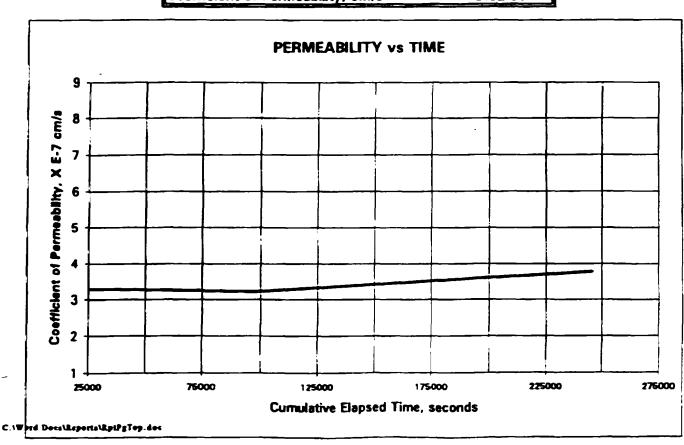
IT LAB SAMPLE NO.

ETDC-8685

	INITIAL	FINAL		•
Specimen diameter, cm	7.61	-		
Specimen length, cm	15.22		Hydraulic gradient	18.5
Wet weight of specimen, g.	1329.02	1345.15	Min. consolidation stress, p	psi 2.0
Specimen cross-sect. area, cm*2	45.4821		Max. consolidation stress,	psai 6.0
Water content, %	20.2	21.6	Total backpressure, psi	6.0
Wet unit weight, pcf	119.9			
Dry unit weight, pcf	99.8		Permeant Fluid [	Deaired DI Water
Estimated degree of saturation, %	81.2			
Estimated spec, gravity of solids	2.65		Specimen not saturated at	test close.

Coefficient of Permeability, cm/s

3.5E-07



#### HYDRAULIC CONDUCTIVITY / PERMEABILITY **ASTM D 5084**

PROJECT NAME: PROJECT NO.

**ERM / Lubrizol** 

806133.01000000

CLIENT SAMPLE NO.

**LBA-26** 

IT LAB SAMPLE NO.

ETDC-8833

	INITIAL	FINAL
Specimen diameter, cm	7.60	

Specimen length, cm

10.20 1302

Hydraulic gradient

20.7

Wet weight of specimen, g. Specimen cross-sect. area, cm²

45.4214

Min. consolidation stress, psi Max. consolidation stress, psi 2.0 5.0

Water content, %

Total backpressure, psi

22.0

Wet unit weight, pcf

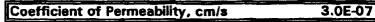
175.5

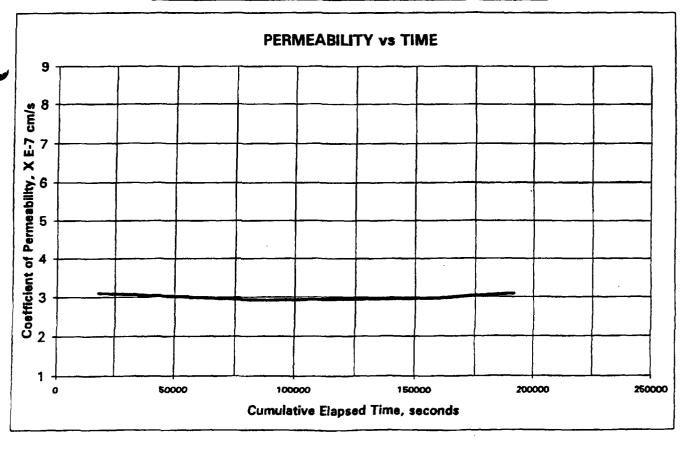
Permeant Fluid

Deaired DI Water

Dry unit weight, pcf Estimated degree of saturation, %

Estimated spec. gravity of solids





#### HYDRAULIC CONDUCTIVITY / PERMEABILITY **ASTM D 5084**

PROJECT NAME:

ERM / Lubrizol

CLIENT SAMPLE NO.

**LBA-27** 

PROJECT NO.

806133.01000000

IT LAB SAMPLE NO.

ETDC-8834

	INITIAL FIN	IAL	
Specimen diameter, cm	7.59		
Specimen length, cm	15.18	Hydraulic gradient	4.6
Wet weight of specimen, g.	1274.2	Min. consolidation stress, psi	2.0
Specimen cross-sect. area, cm*2	45.2497	Max. consolidation stress, psi	3.0
Water content, %		Total backpressure, psi	19.0
Wet unit weight, pcf	115.8		
Dry unit weight, pcf		Permeant Fluid Deai	red DI Wate

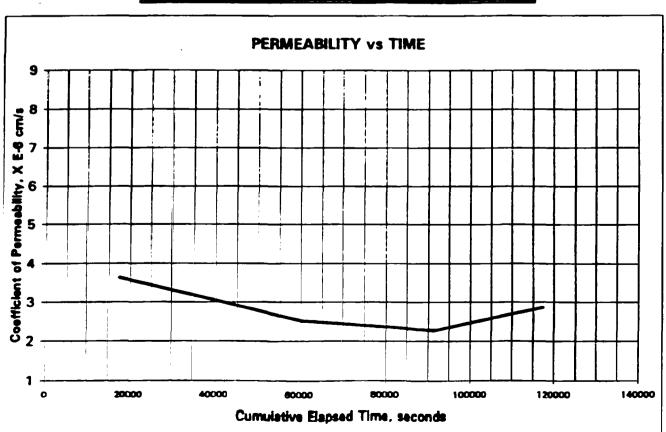
Estimated degree of saturation, %

-io. s. -u., -u.--

Estimated spec. gravity of solids 2.65



2.7E-06



1/ 3



IT Corporation 1570 Bear Creek Road P. O. Box 4339 Oak Ridge, Tennessee 37830 Tel: 865.482.6497 Fax: 865.482.1890

A Member of The IT Group

DELIVER TO:	TOL
Company / Location	TOL
Telephone No.	
Fax No.	
FROM:	RAIPH
	IT CORPORATION Post Office Box 4339 1570 Bear Creek Road Oak Ridge TN 37830
Telephone:	(865) 482-6497
Fax:	(865) 482-1890
Message:	THESE ARE STILL RUNNING, SO DATA IS
DRAFT. BU	T PESULTS AME GOOD ENOUGH TO STOP TESTS
WHICH WE	- ILL DO.
	Page of

PAUL LOAR



IT Corporation Geotechnical Laboratory 1570 Bear Creek Road P. O. Bax 4339 Oak Ridge, Tennessee 37830 Tel: 865.482.6497 Fax: 865.482.1890 A Member of The IT Group

### HYDRAULIC CONDUCTIVITY / PERMEABILITY ASTM D 5084

PROJECT NAME: PROJECT NO.

Estimated spec. gravity of solids

**ERM / Lubrizol** 

806133.01000000

CLIENT SAMPLE NO.

LBB-28 (B)

IT LAB SAMPLE NO.

ETDC-8757

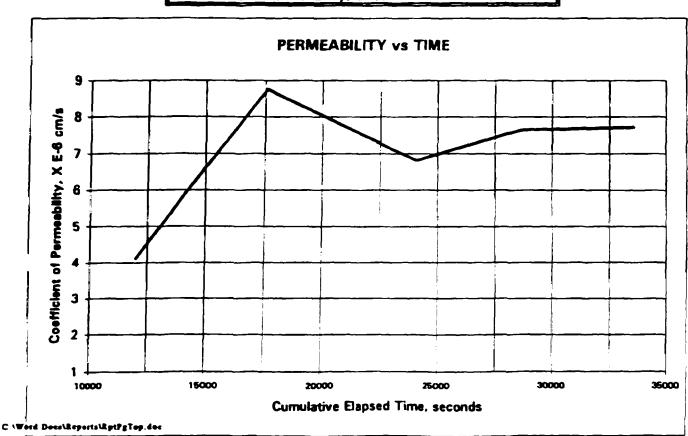
	INITIAL	FINAL	_}	
Specimen diameter, cm	7.62			
Specimen length, cm	15.23		Hydraulic gradient	9.2
Wet weight of specimen, g.	1175.23	1212.10	Min. consolidation stress,	psi 2.0
Specimen cross-sect. area, cm ²	45.6138		Max. consolidation stress,	psi 4.0
Water content, %	20.0	23.7	Total backpressure, psi	4.0
Wet unit weight, pcf	105.6			
Dry unit weight, pcf	88.0		Permeant Fluid	Deaired DI Water
Estimated degree of saturation, %	60.2			

Coefficient of Permeability, cm/s

2.65

7.7E-06

Specimen not saturated at test close.





5-3,-00, c._c.....

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.743 404 1030

#### HYDRAULIC CONDUCTIVITY / PERMEABILITY **ASTM D 5084**

PROJECT NAME:

ERM / Lubrizol

CLIENT SAMPLE NO.

LBB-29 (C)

PROJECT NO.

806133.01000000

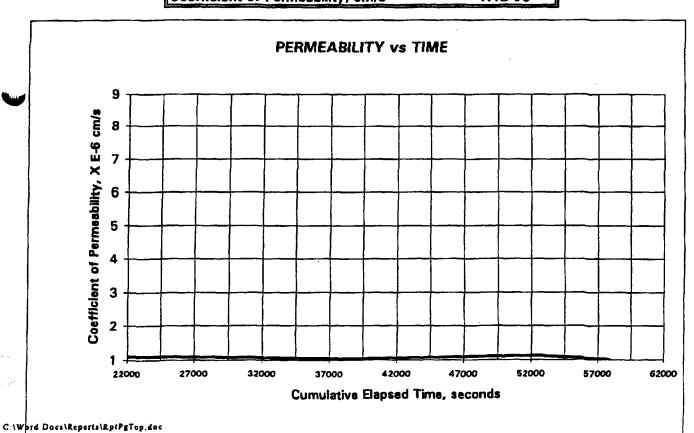
IT LAB SAMPLE NO.

ETDC-8758

	INITIAL	FINAL		
Specimen diameter, cm	7.60		•	
Specimen length, cm	15.15		Hydraulic gradient	13.9
Wet weight of specimen, g.	1192.28	1202.53	Min. consolidation stress,	psi 2.0
Specimen cross-sect. area, cm ²	45.3305		Max. consolidation stress,	psi 5.0
Water content, %	21.7	23.0	Total backpressure, psi	2.0
Wet unit weight, pcf	108.4			
Dry unit weight, pcf	89.0		Permeant Fluid	Deaired DI Water
Estimated degree of saturation, %	67.1			
Estimated spec. gravity of solids	2.65		Specimen not saturated at	test close.

#### Coefficient of Permeability, cm/s

1.1E-06





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#### HYDRAULIC CONDUCTIVITY / PERMEABILITY **ASTM D 5084**

PROJECT NAME:

**ERM / Lubrizol** 

CLIENT SAMPLE NO.

LBB-30 (D)

PROJECT NO.

806133.01000000

IT LAB SAMPLE NO.

ETDC-8759

	INITIAL	FINAL	
Specimen diameter, cm	7.63		_
Specimen length, cm	15.16		Hydraulic gradient
Wet weight of specimen, g.	1174.00	1186.74	Min. consolidation s
Specimen cross-sect. area, cm ²	45.6949		Max. consolidation
Water content, %	24.9	26.2	Total backpressure,

ation stress, psi dation stress, psi 9.3 2.0

Wet unit weight, pcf

105.8

ssure, psi

4.0 4.0

Dry unit weight, pcf Estimated degree of saturation, % 69.2

84.7

Permeant Fluid

Deaired Di Water

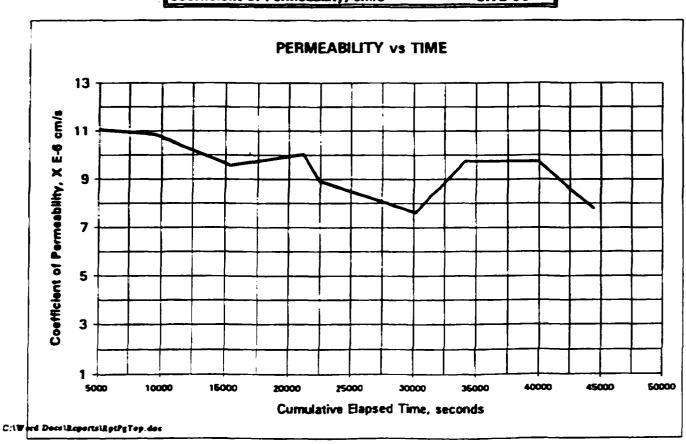
Estimated spec, gravity of solids

2.65

Specimen not saturated at test close.

#### Coefficient of Permeability, cm/s

8.7E-06





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#### HYDRAULIC CONDUCTIVITY / PERMEABILITY **ASTM D 5084**

PROJECT NAME:

Wet unit weight, pcf

**ERM / Lubrizol** 

CLIENT SAMPLE NO.

LBB-31 (E)

PROJECT NO.

806133.01000000

IT LAB SAMPLE NO.

ETDC-8761

7.64 Specimen diameter, cm Specimen length, cm Wet weight of specimen, g. Specimen cross-sect. area, cm²

15.20 1173.54 45.8066

INITIAL

1184.99

FINAL

Hydraulic gradient Min. consolidation stress, psi Max. consolidation stress, psi 9.3 2.0

Water content, %

24.3

25.5

Total backpressure, psi

4.0 3.0

Dry unit weight, pcf

105.3 84.7

67.5

Permeant Fluid

Deaired DI Water

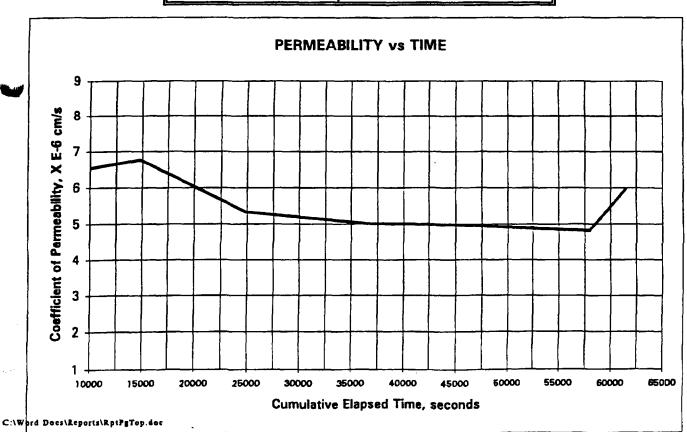
Estimated degree of saturation, % Estimated spec. gravity of solids

2.65

Specimen not saturated at test close.



5.2E-06





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### HYDRAULIC CONDUCTIVITY / PERMEABILITY ASTM D 5084

PROJECT NAME:

ERM / Lubrizol

CLIENT SAMPLE NO.

LBB-32 (F)

PROJECT NO.

806133.01000000

IT LAB SAMPLE NO.

ETDC-8760

INITIAL 7.59

Specimen diameter, cm Specimen length, cm

12.89

Hydraulic gradient

16.4

Wet weight of specimen, g.

1022.62 1035.00

Min. consolidation stress, psi

2.0

Specimen cross-sect. area, cm²

45.2446

25.2

FINAL

Max. consolidation stress, psi Total backpressure, psi 3.0 5.0

Water content, %
Wet unit weight, pcf

23.7 109.5

•

Dry unit weight, pcf

88.5

Permeant Fluid

Deaired DI Water

Estimated degree of saturation, % Estimated spec. gravity of solids

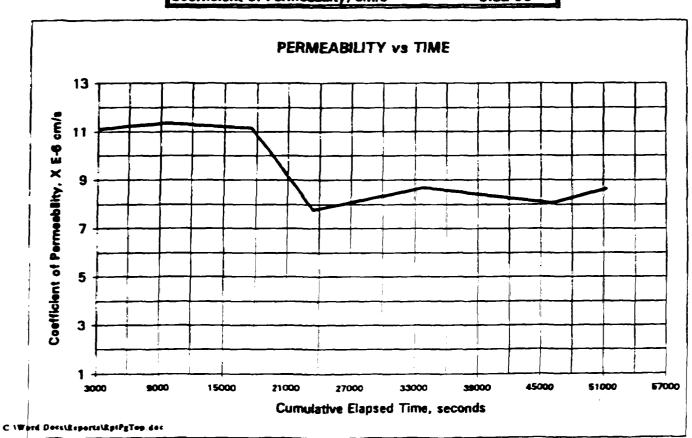
72.2

Specimen not saturated at test close.

Coefficient of Permeability, cm/s

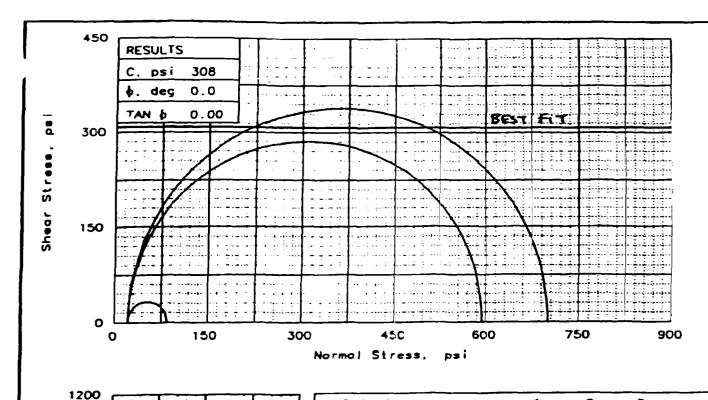
2.65

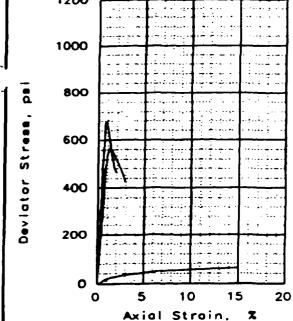
8.3E-06





Appendix D - Triaxial Reports





TYPE OF TEST:

Unconsolidated undrained

SAMPLE TYPE: Mold

DESCRIPTION: Solidified soil

LL= PL= PI=

SPECIFIC GRAVITY= 2.65

REMARKS: Spec. gravity assumed.

SA	MPLE NO.	1	2	3	
	WATER CONTENT, % DRY DENSITY, pcf SATURATION, % VOID RATIO DIAMETER, in HEIGHT, in	95.8	95.0 82.3 0.741 2.00	89.5 85.9 0.848 2.00	
TE	1	95.8	95.0 82.3 0.741 2.00	89.5 85.9 0.848 2.00	
,	rain rate, in/min CK PRESSURE, psi	0.016	0.016		
1	LL PRESSURE, psi	22	_	_	
FA UL	ILURE STRESS, psi PORE PRESSURE, psi IIMATE STRESS, psi	573			•
	PORE PRESSURE, psi FAILURE, psi	505	701	85	
	FAILURE, psi	22			

CLIENT: IT Knoxville

PROJECT: ERM / Lubrisol

SAMPLE LOCATION: Lab sample no. ETDC-8702

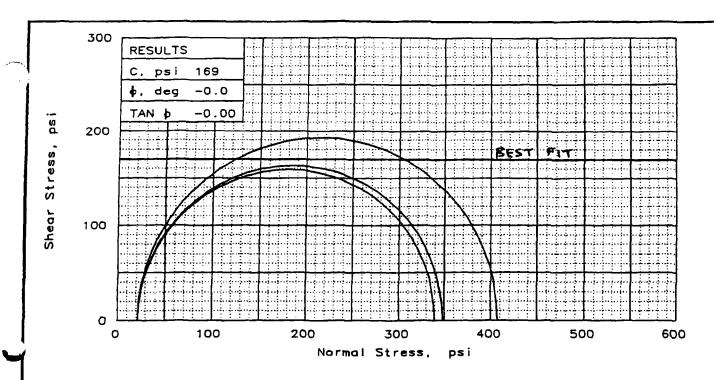
Client somple no. LBA-4

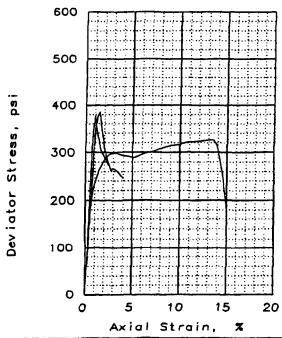
PROJ. NC.: 806133 DATE: May 11, 2000

TRIAXIAL SHEAR TEST REPORT

IT CORPORATION GEOTECHNICAL LABORATORY

FIG. NO. 8702





TYPE OF TEST:

Unconsolidated undrained

SAMPLE TYPE: Mold

DESCRIPTION: Solidified soil

LL= PL= PI= SPECIFIC GRAVITY= 2.65

REMARKS: Spec. gravity assumed

SA	MPLE NO.	1	2	3	
INITIAL	WATER CONTENT, % DRY DENSITY, pcf SATURATION, % VOID RATIO DIAMETER, in HEIGHT, in	91.8	94.8 81.7 0.746 2.00	94.8 82.8 0.746 2.00	
AT TE	DRY DENSITY, pcf SATURATION, % VOID RATIO		94.8 81.7 0.746 2.00	94.8 82.8 0.746 2.00	
St	rain rate, in/min	0.016	0.016	0.016	
	CK PRESSURE, psi	0	0	0	
,	•	22			
UL.	LURE STRESS, psi PORE PRESSURE, psi TIMATE STRESS, psi PORE PRESSURE, psi	326	318	385	
101	FAILURE, psi	348	340	407	
$\sigma_3$	FAILURE, psi	22	22	22	

CLIENT: IT Knoxville

PROJECT: ERM / Lubrisol

SAMPLE LOCATION: Lab sample no. ETDC-8703

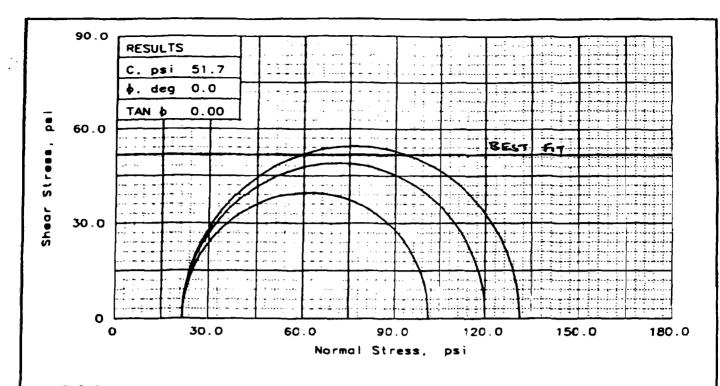
Client sample no. LBA-10

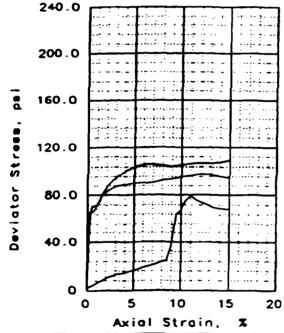
PROJ. NO.: 806133 DATE: May 11, 2000

TRIAXIAL SHEAR TEST REPORT

IT CORPORATION GEOTECHNICAL LABORATORY

FIG. NO. 8703





SA	MPLE NO.	1	2	3	
INITIAL	WATER CONTENT, % DRY DENSITY, pcf SATURATION, % VOID RATIO DIAMETER, in HEIGHT, in	93.6 89.8 0.767 2.00	93.1 87.8 0.777	76.8 56.1 1.155 2.00	
AT TEST	WATER CONTENT, % DRY DENSITY, pcf SATURATION, % VOID RATIO DIAMETER, in HEIGHT, in	93.6 89.8	93.1 87.8 0.777 2.00	76.8 56.1 1.155 2.00	
BA CE FA UL	rain rate, in/min CK PRESSURE, psi LL PRESSURE, psi ILURE STRESS, psi PORE PRESSURE, psi TIMATE STRESS, psi PORE PRESSURE, psi	0.0 22.0 98.0	0.0 22.0 109.0	0.0 22.0 79.3	
$\sigma_{i}$	FAILURE, psi	120.0	131.0	101.3	

Unconsolidated undrained

SAMPLE TYPE: Mold

DESCRIPTION: Solidified soil

LL=

PL-

PI-

SPECIFIC GRAVITY= 2.65

REMARKS: Spec. gravity assumed.

Third specimen results of-

fected by equip. misalignment

FIG. NO. 8704

CLIENT: IT Knoxville

O3 FA'LURE, psi

PROJECT: ERM / Lubrisol

SAMPLE LOCATION: Lab sample no. ETDC-8704

Client sample no. LBA-15

PROJ. NO.: 806133

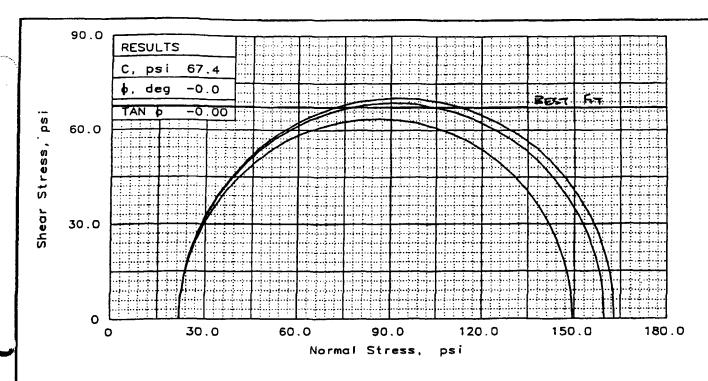
DATE: May 11, 2000

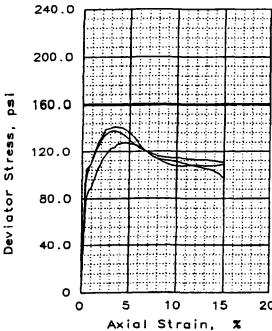
22

22

TRIAXIAL SHEAR TEST REPORT

22





Unconsolidated undrained

SAMPLE TYPE: Mold

DESCRIPTION: Solidified soil

PI= PL-

SPECIFIC GRAVITY= 2.65

SAMPLE	NO.	1	2	3	
DRY I	R CONTENT, % DENSITY, pcf RATION, % RATIO ETER, in HT, in	96.9	97.7 93.0 0.693 2.00	97.5 91.3 0.697 2.00	
DRY C SATUR VOID DIAME	R CONTENT, % DENSITY, pcf RATION, % RATIO ETER, in HT, in	24.4 96.9 91.5 0.708 2.00 4.00	97.7 93.0 0.693 2.00	97.5 91.3 0.697 2.00	
Strain BACK PR CELL PR FAILURE PORE ULTIMAT	rate, in/min ESSURE, psi ESSURE, psi STRESS, psi PRESSURE, psi E STRESS, psi PRESSURE, psi	22.0 137.7	0.0 22.0 127.4	0.0 22.0 141.0	
O1 FAILU	-		149.4 22		

CLIENT: IT Knoxville

PROJECT: ERM / Lubrisol

SAMPLE LOCATION: Lab sample no. ETDC-8705

Client sample no. LBA-18

PROJ. NO.: 806133

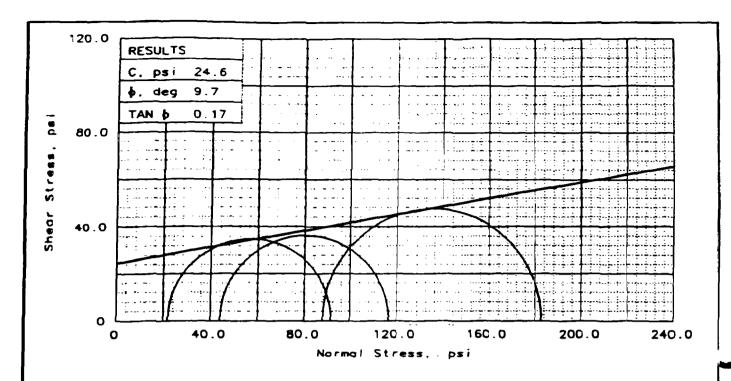
DATE: May 11, 2000

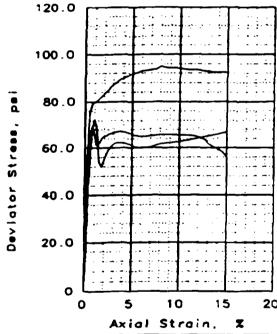
TRIAXIAL SHEAR TEST REPORT

IT CORPORATION GEOTECHNICAL LABORATORY

REMARKS: Spec. gravity assumed.

FIG. NO. 8705





20

TYPE OF TEST:

Unconsolidated undrained

SAMPLE TYPE: Mold

DESCRIPTION: Solidifed sludge

PI-PL= LL-SPECIFIC GRAVITY= 2.65 REMARKS: Spec gravity assumed. Results based on best-fit failure envelope.

FIG. NO. 8864

SA	MPLE NO.	1	2	3	
INITIAL	DIAMETER, in	87.8	91.1 89.0 0.815 2.00	66.0 137.5 1.508 1.99	
TEST	•	87.8	91.1 89.0 0.815 2.00	66.0 47.2 1.508 1.99	
BA	rain rate, in/min CK PRESSURE, psi	0.0	0.0	0.0	
1	LL PRESSURE, psi ILURE STRESS, psi PORE PRESSURE, psi				
	TIMATE STRESS, psi PORE PRESSURE, psi FAILURE, psi		66.9		
1	FAILURE, psi	22	· -		

CLIENT: IT Knoxville

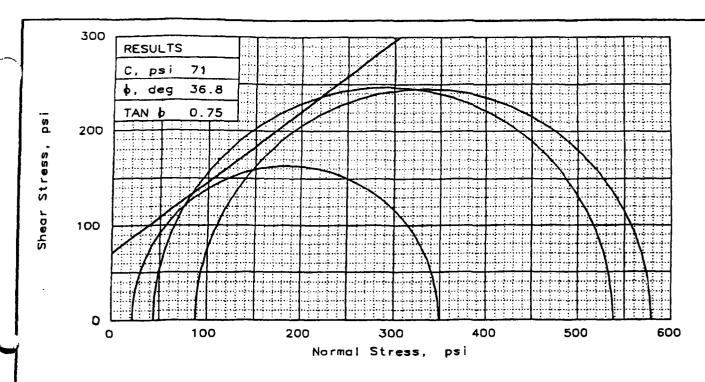
PROJECT: ERM / Lubrizol

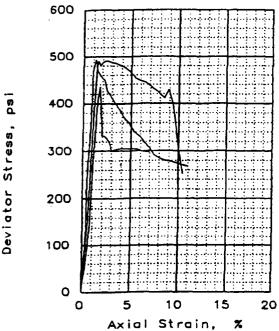
SAMPLE LOCATION: Lab sample no. ETDC-8864

Client sample no. LBA-26

PROJ. NO.: 806133 DATE: May 29, 2000

TRIAXIAL SHEAR TEST REPORT





Unconsolidated undrained

SAMPLE TYPE: Mold

DESCRIPTION: Solidified sludge

LL=

PL=

PI-

SPECIFIC GRAVITY= 2.65

REMARKS: Spec gravity assumed.

Results based on best-fit

failure envelope.

FIG. NO. 8865

SA	MPLE NO.	11	2	3	<u> </u>
INITI		92.1	92.6 84.0 0.786 2.00	93.4 86.3 0.770 2.00	
AT TEST	WATER CONTENT, % DRY DENSITY, pcf SATURATION, % VOID RATIO DIAMETER, in HEIGHT, in	92.1 82.6	92.6 84.0	93.4 86.3	
BAC CEL FAI	LL PRESSURE, psi ILURE STRESS, psi PORE PRESSURE, psi IIMATE STRESS, psi PORE PRESSURE, psi	0 22 327 298	0 44 494	0 88 491 411	
	FAILURE, psi FAILURE, psi	22		88	

CLIENT: IT Knoxville

PROJECT: ERM / Lubrizol

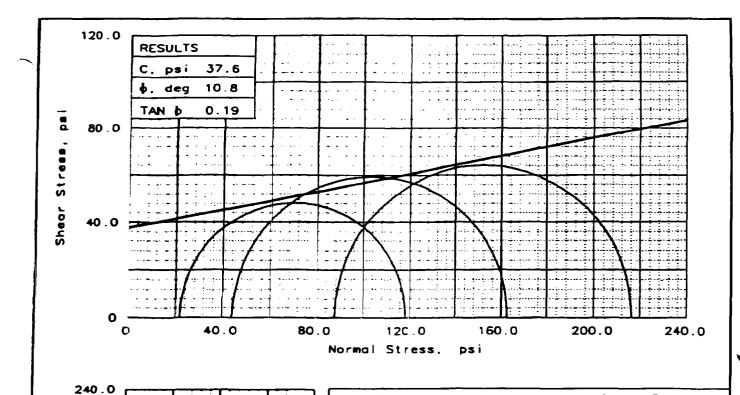
SAMPLE LOCATION: Lab sample no. ETDC-8865

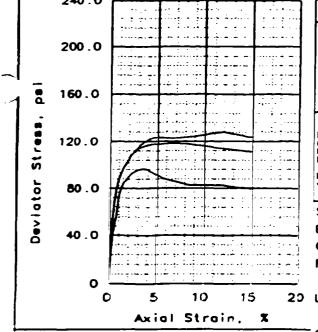
Client sample no. LBA-27

PROJ. NO.: 806133

DATE: May 29, 2000

TRIAXIAL SHEAR TEST REPORT





SA	MPLE NO.	1	2	3	
17 I	DIAMETER, in	85.2	86.4 75.0 0.915 2.00	86.5 75.3 0.913 2.00	
AT TEST	WATER CONTENT, % DRY DENSITY, pcf SATURATION, % VOID RATIO DIAMETER, in HEIGHT, in	85.2	86.6 75.4 0.910 2.00	86.6 75.5 0.910 2.00	
St	rain rate, in/min	0.020	0.016	0.020	
	CK PRESSURE, psi				
CE	LL PRESSURE, psi	22.0	44.0	88.0	
FA	ILURE STRESS, psi PORE PRESSURE, psi	96.4	118.7	128.3	
	TIMATE STRESS, psi PORE PRESSURE, psi	79.3	111.2	124.2	
$\sigma_1$	FAILURE, psi	118.4	162.7	216.3	
Ø3	FAILURE, psi	22	44	88	

Unconsolidated undrained

SAMPLE TYPE: Mold

DESCRIPTION: Solidified sludge

LL= PL= PI= SPECIFIC GRAVITY= 2.65

REMARKS: Spec gravity assumed

Results based on best-fit

failure envelope, not

theoretically sat'd sample.

FIG. NO. 8859

CLIENT: IT Knoxville

PROJECT: ERM / Lubrizol

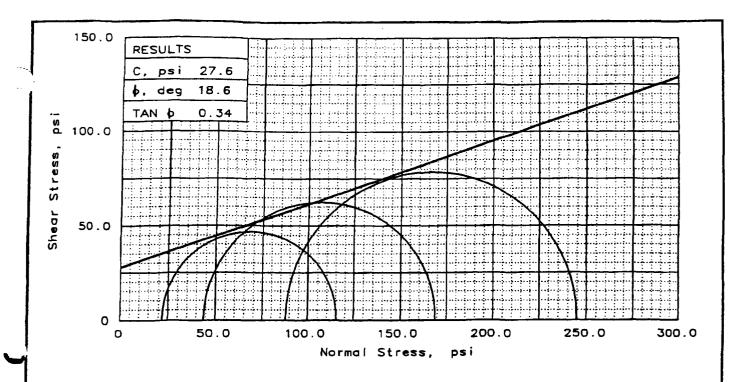
SAMPLE LOCATION: Lab sample no. ETDC-8859

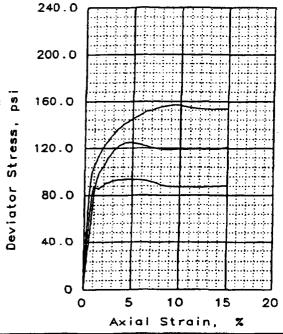
Client sample no. LBB-28(B)

PROJ. NO.: 806133

DATE: May 25, 2000

TRIAXIAL SHEAR TEST REPORT





Unconsolidated undrained

SAMPLE TYPE: Mold

DESCRIPTION: Solidified sludge

LL= PL= PI= SPECIFIC GRAVITY= 2.65

REMARKS: Spec gravity assumed

Results based on best-fit failure envelope, not

theoretically sat'd sample.

FIG. NO. 8860

	SA	MPLE NO.	1	2	3	
	INITIAL	WATER CONTENT, % DRY DENSITY, pcf SATURATION, % VOID RATIO DIAMETER, in HEIGHT, in	84.8	86.0 74.9 0.923 2.00	86.2 76.3 0.919 2.00	
	AT TEST	WATER CONTENT, % DRY DENSITY, pcf SATURATION, % VOID RATIO DIAMETER, in HEIGHT, in	27.1 85.4 76.6 0.937 2.00 4.00	87.2 77.0 0.898 1.99	86.4 76.7 0.915 2.00	
	St BAC CE FA UL	rain rate, in/min CK PRESSURE, psi LL PRESSURE, psi ILURE STRESS, psi PORE PRESSURE, psi IIMATE STRESS, psi PORE PRESSURE, psi FAILURE, psi FAILURE, psi	0.0 22.0 93.5	0.0 44.0 125.0 120.8	0.0 88.0 157.0 153.4 245.0	
- [	i					

CLIENT: IT Knoxville

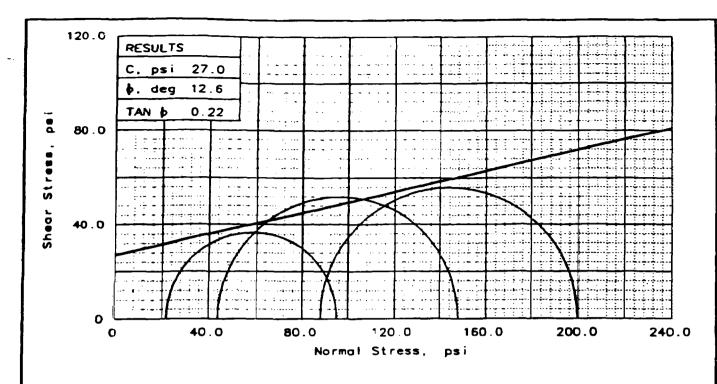
PROJECT: ERM / Lubrizol

SAMPLE LOCATION: Lab samp[le no. ETDC-8860

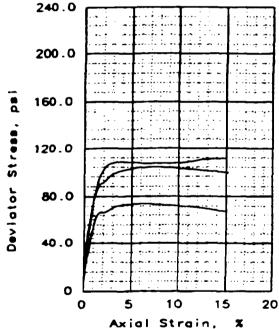
Client sample no. LBB-29(C)

PROJ. NO.: 806133 DATE: May 25, 2000

TRIAXIAL SHEAR TEST REPORT



SAMPLE NO.



WATER CONTENT, % DRY DENSITY, pcf SATURATION, % VOID RATIO DIAMETER, in HEIGHT, in	82.5	83.7 75.2 0.977 2.00	84.0 74.7 0.969 2.00	
WATER CONTENT, % DRY DENSITY, pcf SATURATION, % VOID RATIO DIAMETER, in HEIGHT, in	82.6 75.4 1.003 2.00	84.4 76.5 0.960 2.00	84.0 74.7 0.969 2.00	
Strain rate, in/min BACK PRESSURE, psi CELL PRESSURE, psi FAILURE STRESS, psi PORE PRESSURE, psi ULTIMATE STRESS, psi PORE PRESSURE, psi	0.0 22.0 73.2	0.0 44.0 103.8	0.0 88.0 111.7	
• •	95.2 22	147.8 44		

TYPE OF TEST:

Unconsolidated undrained

SAMPLE TYPE: Mold

DESCRIPTION: Solidified sludge

PI-

LL= PL=

SPECIFIC GRAVITY= 2.65

REMARKS: Spec gravity assumed

Results based on best-fit

failure envelope, not-fit

theoretically sat'd sample.

FIG. NO. 8861

CLIENT: IT Knoxville

PROJECT: ERM / Lubrizol

SAMPLE LOCATION: Lab sample no. ETDC-8861

Client somple no. LBB-30(D)

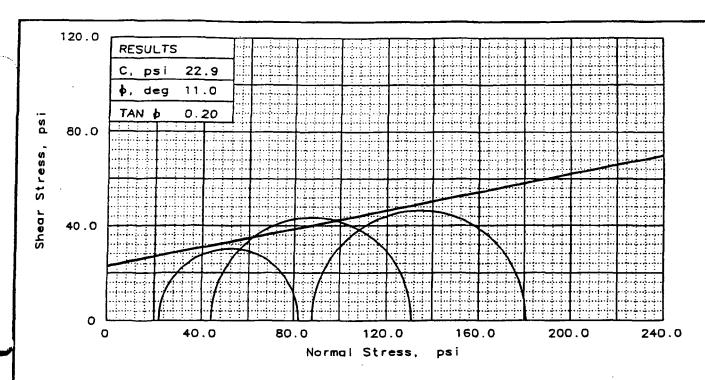
PROJ. NO.: 806133

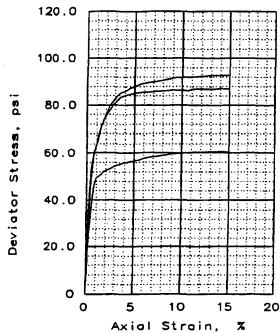
DATE: May 25, 2000

2

3

TRIAXIAL SHEAR TEST REPORT





TYPE OF TEST:
Unconsolidated undrained
SAMPLE TYPE: Mold

DESCRIPTION: Solidified sludge

LL= PL= PI=
SPECIFIC GRAVITY= 2.65
REMARKS: Spec gravity assumed
Resluts based on best-fit
failure envelope, not
theoretically sat'd sample.
FIG. NO. 8862

SA	MPLE NO.	1	2	3	
INITIAL	VOID RATIO		82.2 75.0 1.012 2.00	82.3 75.7 1.010 2.00	
AT TEST	WATER CONTENT, % DRY DENSITY, pcf SATURATION, % VOID RATIO DIAMETER, in HEIGHT, in	29.8 81.5 76.9 1.029 2.00 4.00	82.4 75.2 1.008 2.00	82.3 3240.9 1.010 2.00	
St	rain rate, in/min	0.036	0.030	0.032	
BA	CK PRESSURE, psi	0.0	0.0	0.0	
CE	LL PRESSURE, psi	22.0	44.0	88.0	
FA	ILURE STRESS, psi PORE PRESSURE, psi	60 . 1	87.0	92.8	
Or.	TIMATE STRESS, psi PORE PRESSURE, psi	60.3	87.1	92.8	
10,	FAILURE, psi	82.1	131.0	180.8	
σ3	FAILURE, psi	22	44	88	

CLIENT: IT Knoxville

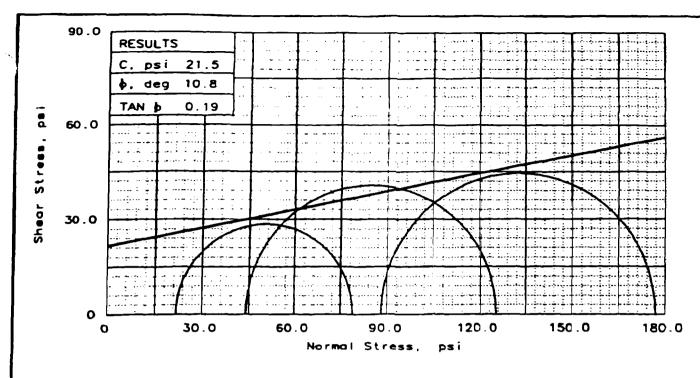
PROJECT: ERM / Lubrizol

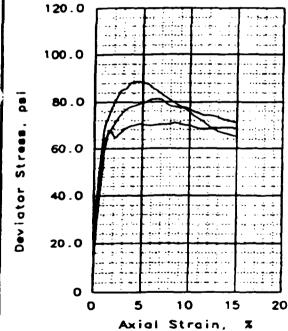
SAMPLE LOCATION: Lab sample no. ETDC-8862

Client sample no. LBB-31(E)

PROJ. NO.: 806133 DATE: May 25, 2000

TRIAXIAL SHEAR TEST REPORT





SAMPLE TYPE: Mold

DESCRIPTION: Solidified sludge

Unconsolidated undrained

PI-PL-SPECIFIC GRAVITY= 2.65

REMARKS: Spec gravity assumed Results based on best-fit failure envelope, not theoretically sat'd sample.

FIG. NO. 8863

SA	MPLE NO.	1	2	3	
INITIAL	l .	86.2	87.0 76.7 0.900 2.00	85.0 81.8 0.946 2.00	-
AT TEST	DRY DENSITY, pcf SATURATION, % VOID RATIO DIAMETER, in	26.9 86.9 78.8 0.903 2.00 3.98	87.3 77.1 0.896 2.00	85.9 83.6 0.925 1.99	
St	rain rate, in/min	0.036	0.030	0.032	
BA	CK PRESSURE, psi	0.0	0.0	0.0	
CE	LL PRESSURE, psi	22.0	44.0	88.0	
i i	ILURE STRESS, psi PORE PRESSURE, psi	56.9	81.3	88.9	
,	TIMATE STRESS, psi PORE PRESSURE, psi	68.1	71.0	65.2	
$\sigma_1$	FAILURE, psi	78.9	125.3	176.9	
03	FAILURE, psi	22	44	88	

CLIENT: IT Knoxville

PROJECT: ERM / Lubrizot

SAMPLE LOCATION: Lab sample no. ETDC-8863

Client sample no. LBB-32(F)

DATE: May 25, 2000 PROJ. NO.: 806133

TRIAXIAL SHEAR TEST REPORT

### Appendix P Alternative Costs Details

### Alternative: #1 Selective Soll Physical Solidification With Engineered Clay Cap

Assumptions: Total of 62,000 cubic yards of waste oil impacted soils

10,000 cubic yards of impacted material will be solidified to provide adequate support for the cap

10,000 cubic yards of impacted material = 15,000 tons of impacted material

Physical solidification agents to be used (from treatability testing) = 15% Portland cement, 5% hydrated lime

							Cost	
Item							Source	Comments
Solidification of Impacted Material								
Solidification	\$45 / cu yd	x	10,000	cu yd	-	\$450,000	Huscley/ERM	Includes solidification agents
Engineered Clay Cap								
12" - leveling layer	\$22 / cu yd	X	5200	cu yd	-	\$114,400	Huseley	Unclassified fill, off site, spreading, compaction
12" - low permeability clay	\$36 / cu yd	X	5200	cu yd	-	\$187,200	Haseley	1 x 10-7 off site, 6" lifts, compaction
12" - common borrow	\$22 / cu yd	x	5200	cu yd	-	\$114,400	linseley	Unclassified fill, off site, spreading, compaction
12" - Topsoil & Seeding	\$27,800 / acre	X	3.2	cu yd	-	\$88,960	Hascley	Material from off-site, 6" lifts
Testing	\$20,000 / lump sum	X	I	each	-	\$20,000		Estimated cost
Water Management								
Water Management								
Non- Contact Surface Water Management	\$76,000 / lump sum	X	1	each	-	\$76,000		Cost used in previous cost estimates
Site Access Restriction								
7' Security Fence / Barb wire	\$28 / lin ft	x	2280	lin ft	-	\$63,840	Means	
Engineering								
Design	\$75,000 / lump sum	v	1	each	_	\$75,000		Estimated cost
Oversight	\$15,000 / month	X	2.5	month	1# <b>-</b>	\$37,500		Estimated cost
Oversight	\$15,000 / IIIOIIIII	^	<b></b> .	11107111	••	457,500		
Legal, Insurance, Permits								
Legal, Insurance, Permits	\$100,000 / lump sum	x	1	each	-	\$100,000	1	Estimated cost
				тот	`AL:	\$1,327,300	1	

^{**} Time period to complete = Approximately 2.5 months (Haseley)

### Alternative: #2 Soil Chemical Stabilization With Engineered Clay Cap

Assumptions: Total of 62,000 cubic yards of waste oil impacted soils

62,000 cubic yards of impacted material will be stabilized

62,000 cubic yards of impacted material = 93,000 tons of impacted material

Chemical stabilization agents to be used = 22.5% Portland cement, 7.5% hydrated lime - Assumed that chemical stabilization

will require 1.5 times the percentage of agents needed for physical solidification of the material (as determined in the treatability study)

							Cost	
Item							Source	Comments
Stabilization of Impacted Material								
Stabilization	\$65 / cu yd	x	62,000	cu yd	=	\$4,030,000	Haseley/ERM	Includes stabilization agents
Engineered Clay Cap								
12" - leveling layer	\$22 / cu yd	x	5200	cu yd	=	\$114,400	Haseley	Unclassified fill, off site, spreading, compaction
12" - low permeability clay	\$36 / cu yd	X	5200	cu yd	=	\$187,200	Haseley	1 x 10-7 off site, 6" lifts, compaction
12" - common borrow	\$22 / cu yd	X	5200	cu yd	=	\$114,400	Haseley	Unclassified fill, off site, spreading, compaction
12" - Topsoil & Seeding	\$27,800 / acre	X	3.2	cu yd	=	\$88,960	Haseley	Material from off-site, 6" lifts
Testing	\$20,000 / lump sum	X	1	each	=	\$20,000		Estimated cost
Water Management								
Non-Contact Surface Water Management	\$76,000 / lump sum	X	1	each	=	\$76,000		Cost used in previous cost estimates
Site Access Restriction								
7' Security Fence / Barb wire	\$28 / lin ft	x	2280	lin ft	=	<b>\$</b> 63,840	Means	
Engineering								
	\$75,000 / lump sum	v	1	each	=	\$75,000		Estimated cost
Design	\$15,000 / month	X	7	month		\$105,000		Estimated cost
Oversight	\$15,000 / monai	X	,	HOH	15	\$105,000		Estimated cost
Legal, Insurance, Permits								
Legal, Insurance, Permits	\$100,000 / lump sum	x	1	each	=	\$100,000		Estimated cost
				тот	AL:	\$4,974,800		
** Time period to complete = Approxima	taly 7 months (Haseley)					± .,. / .,e		

^{**} Time period to complete = Approximately 7 months (Haseley)

### Alternative: #3 Excavation, Off-Site Landfilling, Backfill with Clean Fill

Assumptions: Total of 62,000 cubic yards of waste oil impacted soils

62,000 cubic yards of impacted material will be excavated, transported and disposed off-site

Half (31,000 cubic yards) of impacted material to be disposed of as hazardous waste. Half (31,000 cubic yards) of impacted material to be disposed of as non-hazardous waste.

31,000 cubic yards = 46,500 tons

Item							Cost Source	Comments
Excavation								
Excavation (Equipment, labor, etc.)	\$12.70 / cu yd	x	62,000	cu yd	-	\$787,400	Haseley	
Transportation & Disposal (To The Enviro	onmental Quality Com	pany	, Bellevil	le Michi	gan,	located appr	oximatel	y 100 miles from the site.)
Total assumed quantity of impacted soil to b	e disposed of - 93,000 t	ons.	At a load	ing of 2	) ton	s of impacted	noil/truck	load this would equate to 4,650 truckloads.
Non-hazardous Waste	\$25.30 / ton	x	46500	tons	-	\$1,176,450	EQ	
Hazardous Waste (D-series metals only)	\$87.47 / ton	X	46500	tons	-	\$4,067,355	EQ	
Haz Waste (D-series metals / F-Listed) high	\$310 / ton	x	0	tons	-	\$0	EQ	('ost if required
Васкііі								
Common Fill Material	\$19.75 / cu yd	x	44,800	cu yd		\$884,800	Haseley	
12" Topsoil & Seeding	\$27,800 / acre	x	3.2	acre	-	\$88,960	Haseley	
Testing	\$20,000 / lump sum	x	1	each	-	\$20,000	·	Estimated cost
Water Management								
Non-Contact Surface Water Management	\$76,000 / lump sum	x	1	cach	-	\$76,000		Cost used in previous cost estimates
Contact Water Management	\$500,000 / lump sum		1	each	•	\$500,000		Contingency Allowance
Site Access Restriction								
7' Security Fence / Barb wire	\$28 / lin ft	x	2280	lin ft	•	\$63,840	Means	
Engineering								
Design	\$30,000 / lump sum	¥	1	each	-	\$30,000		Estimated cost
Oversight	\$15,000 / month	X	8	month	g =	\$120,000		Estimated cost
<del>-</del>	·							
Legal, Insurance, Permits								
Legal, Insurance, Permits	\$100,000 / lump sum	x	i	each	=	\$100,000		Estimated cost
				тот	AL:	\$7,914,805		

^{**} Time period to complete = Approximately 8 months (Haseley)

Alternative: #4 Selective Soil Physical Solidification With OAC 3745-27-11 Cap

Assumptions: Total of 62,000 cubic yards of waste oil impacted soils

10,000 cubic yards of impacted material will be solidified to provide adequate support for the cap

10,000 cubic yards of impacted material = 15,000 tons of impacted material

Physical solidification agents to be used (from treatability testing) = 15% Portland cement, 5% hydrated lime

Cost

							Cost	
Item							Source	Comments
Solidification of Impacted Material								
Solidification	\$45 / cu yd	x	10,000	cu yd	=	\$450,000	Haseley/ERM	Includes solidification agents
OAC 3745-27-11 Cap								
12" - leveling layer	\$22 / cu yd	x	5200	cu yd	=	\$114,400	Haseley	Unclassified fill, off site, spreading, compaction
Geotextile fabric	\$9 / sq yd	x	15500	sq yd	=	\$139,500	Means	6 oz/sy 60 mil
Flexible membrane liner/net	\$21.00 / sq yd	x	15500	sq yd	=	\$325,500	Haseley	60 mil HDPE
Geosynthetic clay liner	\$7.25 / sq yd	x	15500	sq yd	=	\$112,375	Haseley	
18" rooting zone	\$22 / cu yd	x	7800	cu yd	=	\$171,600	Haseley	Unclassified fill, off site, spreading, compaction
6" topsoil & seeding	\$13,900 / acre	х	3.2	acres	=	\$44,480	Haseley	Material from off-site, 6" lifts
Testing	\$20,000 / lump sum	x	1	each	=	\$20,000		Estimated cost
Water Management								
Non-Contact Surface Water Management	\$76,000 / lump sum	x	1	each	=	\$76,000		Cost used in previous cost estimates
Site Access Restriction								
7' Security Fence / Barb wire	\$28 / lin ft	x	2280	lin ft	=	\$63,840	Means	
Engineering								
Design	\$75,000 / lump sum	х	1	each	=	\$75,000		Estimated cost
Oversight	\$15,000 / month	x	2.5	month	s =	\$37,500		Estimated cost
Legal, Insurance, Permits								
Legal, Insurance, Permits	\$100,000 / lump sum	x	1	each	=	\$100,000		Estimated cost
				тот	`AL:	\$1,730,195		

^{**} Time period to complete = Approximately 2.5 months (Haseley)

### Alternative: #5 Soil Chemical Stabilization With OAC 3745-27-11 Cap

Assumptions: Total of 62,000 cubic yards of waste oil impacted soils

62,000 cubic yards of impacted material will be stabilized

62,000 cubic yards of impacted material = 93,000 tons of impacted material

Chemical stabilization agents to be used = 22.5% Portland cement, 7.5% hydrated lime - Assumed that chemical stabilization

will require 1.5 times the percentage of agents needed for physical solidification of the material (as determined in the treatability study)

Cost

							Cost	
Item							Source	Comments
Stabilization of Impacted Material								
Stabilization	\$65 / cu yd	x	62,000	cu yd	-	\$4,030,000	Haseley/ERM	Includes stabilization agents
OAC 3745-27-11 Cap								
12" - leveling layer	\$22 / cu yd	X	5200	cu yd	•	\$114,400	Haseley	Unclassified fill, off site, spreading, compaction
Geotextile fabric	\$9 / sq yd	X	15500	sq yd	**	\$139,500	Means	6 oz/sy 60 mil
Flexible membrane liner/net	\$21.00 / sq yd	X	15500	nq yd	•	\$325,500	Haseley	60 mil HDPE
Geosynthetic clay liner	\$7.25 / sq yd	X	15500	sq yd	-	\$112,375	Haseley	
18" rooting zone	\$22 / cu yd	X	7800	cu yd	-	\$171,600	Haseley	Unclassified fill, off site, spreading, compaction
6" topsoil & seeding	\$13,900 / acre	X	3.2	acres	-	\$44,480	Haseley	Material from off-site, 6" lifts
Testing	\$20,000 / lump sum	X	ì	each	-	\$20,000		Estimated cost
Water Management								
Non-Contact Surface Water Management	\$76,000 / lump sum	X	1	each	•	<b>\$</b> 76,000		Cost used in previous cost estimates
Site Access Restriction 7' Security Fence / Barb wire	\$28 / lin ft	x	2280	lin ft	•	\$63,840	Means	
Engineering								
——————————————————————————————————————	\$75,000 / lump sum			each	_	\$75,000		Estimated cost
Design Oversight	\$15,000 / month	x	7	month		\$105,000		Estimated cost
Oversight	313,000 / month	^	,	HOH		\$105,000		Lottinuted Cost
Legal, Insurance, Permits								
Legal, Insurance, Permits	\$100,000 / lump sum	¥	1	each	-	\$100,000		Estimated cost
rogan, madianos, i cima	a , co, coo , rump sum	^	•			4.00,000		
				TOT	`AL:	\$5,377,695		
								•

^{**} Time period to complete = Approximately 7 months (Haseley)

#### Greiner's Lagoon EE/CA Capital Cost Back Up

Alternative: #6 Phytoremediation

Assumptions: Total of 62,000 cubic yards of waste oil impacted soils

ltem	Unit Cost	Units	Cost
Grading Leveling the Surface with 6' drag harrow	\$5 MSF x	139.4 MSF =	\$697
Sulfur Addition			
Spreading 70 lbs per 1000 square feet fertilizer with tractor drawn spreader Mixing with a 6' wide tractor driven tiller, 6" deep	\$282 acre x \$5 MSF x		<b>\$</b> 904 <b>\$</b> 697
Soft spots - amend top 2' with soil			
Temporarily moving top 2' of soil	\$2 CY x	10325 CY =	\$21,270
6" fill soil	\$13 CY x	2581 CY =	\$32,263
Spread 6" of fill soil	\$1 CY x	2581 CY =	\$2,400
Operator and Equipment rental	\$2,700 day x	1 day =	\$2,700
Till to maximum depth possible with 6' wide tractor driver tiller (8 feet)	\$2 MSF x	139.4 MSF =	\$262
Bring back 2' of soil	\$2 CY x	10325 CY =	\$21,270
6" fill soil	\$13 CY x		<b>\$</b> 32,263
Spread 6" of fill soil	\$1 CY x		\$2,400
Till to maximum depth possible with 6' wide tractor driver tiller (8 feet) (do 1/2 of the site at a time)	\$2 MSF x	139.4 MSF =	\$262
<u>Vegetative Clearing</u> Clear medium brush and small trees	\$2,573 acre x	3.2 acres =	\$8,234
Creat medium brush and small trees	\$2,575 acic ^	J.Z deies	30,234
Yegetative Cover			
Addition of 12" topsoil and Grass Planting	\$27,800 acre x	3.2 acre =	\$88,960
Tree Planting	\$30 each x	453 each =	\$13,590
Fertilizer and Irrigation during 1st Year			
Fertilizer - twice in first year	\$282 acre x		\$1,807
Irrigation - 4,000 gailon Water truck	\$365 day x	26 days =	<b>\$9,49</b> 0
(assume watering once a week during growing season for first year)			
Surface Water Management			
Non-Contact Surface Water Management	\$76,000 / lump sun	1 each =	\$76,000
Site Access Restriction			
7' Security Fence / Barb wire	\$28 / lin ft	x 2280 lin ft =	\$63,840
Engineering			
Design	\$75,000 / lump sun :	x l each =	\$75,000
Oversight	\$30,000 / lump sun :		\$30,000
Legal, Insurance, Permits			
Legal, Insurance, Permits	\$100,000 / lump sun	x 1 each =	\$100,000
		TOTAL:	\$584,307

# Appendix Q Summary of Potential ARARs

- Federal ARARs
- Ohio EPA ARARs

	ARAR	
Potential ARAR	TYPE	Comments
40 USC §§ 300 et seq Safe Drinking Water Act	Chemical	This statute applies to public water systems. CERCLA Section 121(d) requires MCLGs to be attained where such goals are relevant and appropriate under the circumstances of the release.
40 CFR Part 141 - National Primary Drinking Water Standards	Chemical	These regulations establish maximum contaminant levels (MCLs) for public water systems. MCLs are conservative health-based standards.
40 CFR Part 143 - National Secondary Drinking Water Standards	Chemical	These regulations establish secondary maximum contaminant levels (SMCLs) for public water systems. SMCLs are conservative health-based standards are non-enforceable guidelines for public water supplies.
42 USC §§ 300g-1 and Health Advisories- Maximum Contaminant Level Goals	Chemical	This statute established maximum contaminant level goals (MCLGs) for public water systems, and are unenforceable goals for the quality of public water systems. MCLGs are conservatively set at levels for which there are no known or anticipated adverse health effects and provide for an adequate margin of safety. CERCLA Section 121(d) requires MCLGs to be attained where such goals are relevant and appropriate under the circumstraces of the release.
33 USC § 1251 et seq Clean Water Act	Chemical Action	This act sets forth various provisions relating to the prevention of water pollution from point sources and the maintenance of surface water quality. Non-point source pollution is not controlled except through the setting and maintenance of water quality standards.
40 CFR Part 131 - Water Quality Criteria	Chemical	These regulations require states to set ambient water quality criteria based on use classifications.
40 CFR Parts 122 and 125 - National Pollutant Discharge Elimination System Permits (NPDES)	Chemical	These regulations require permits to discharge any pollutant from a point source to the waters of the United States.
40 CFR Part 136 - Guidelines for Establishing Test Procedures	Chemical	These regulations establish procedures for the analysis of pollutants in water.
40 CFR Part 403 - National Pretreatment Standards	Chemical	These regulations establish standards to control pollutants which pass through or interfere with treatment processes in publicly owned treatment works (POTWs).
40 CFR Part 122 - Stormwater Discharges	Action	These regulations establish permitting requirements and procedures for stormwater discharges.
33 USC § 1344 - Dredge and Fill Permits	Action	This statute requires that a permit be issued by the U.S. Army Corps of Engineers for any placement of fill material in the waters of the United States.
33 USC § 403 - Rivers and Harbors Act	Action	This statute prohibits obstructions into rivers without a permit.
42 USC § 6901 et seq Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act	Action	This act details various design, operation, and maintenance requirements for solid waste disposal facilities.
40 CFR Part 241 - Guidelines for the Land Disposal of Solid Wastes	Action	These regulations establish minimum performance levels for the design, construction, and operation of new solid waste landfills.
40 CFR Part 267 - Criteria for Hazardous Waste Landfills	Action	These regulations establish minimum national standards for design, construction, and operation of hazardous waste landfills.
40 CFR Part 258 - Criteria for Municipal Solid Waste Landfills	Action	These regulations establish minimum nation standards for design, construction, and operation of municipal waste landfills
40 CFR Part 260- General Hazardous Waste Systems Management	Action	These regulations set forth procedures and criteria for modifying other provisions of RCRA.
40 CFR Part 261 - Identification and Listing of Hazardous Wastes	Chemical	These regulations define hazardous wastes by list and by criteria.

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### SUMMARY OF POTE IN TIAL FEDERAL ARARS

•	ARAR	
Potential ARAR	TYPE	Comments
40 C.FR Part 262 - Standards Applicable to Generators of Hazardous Wastes	Action	These regulations establish standards of operation and management for those who handle hazarifuss wastes
40 CFR Part 263 - Standards Applicable to Owners and Operators of Lazardous Waste TSD Facilities	Action	These regulations establish minimum national standards for owners and operators of IND facilities
40 CFR Part 268 - Land Disposal Restrictions	Action	Those regulations establish a timetable for the restriction of land disposal of certain wastes
40 CFR Part 280 - Hazardous Waste Permit Program	Action	These regulations establish requirements for obtaining RCRA program permits
16 USC §§ 661 et seq., 40 CFR Part 6, 40 CFR § 264 18, and Ruscutive Order No. 11988 - Flood Plain Management	Location	These provisions require that any action in a floodplain be managed to avoid adverse effects
16 USC 88 1531 et seg , 50 CFR Part 200, and 50 CFR Part 402 - Endangered Species Act	Location	These provisions require actions to conserve a critical habitat upon which an endangered species depends
le USC \$\$ 661 et seq., 33 CFR Parts 320-330, and 40 CFR \$ 6 302 - Fish- and Wildlife Coordination Act	Lax elion	These provisions require actions to protect fish or wildlife from diversion, channeling, or other actions that modify a stream or river, affecting the fish or wildlife
29 USC § 651-678 - Occupational Safety and Health Act	Action	This statute acts forth standards to purion I worker health and safety
40 C.FR Part & and Executive Order No. 11990 - Protection of Wetlands	Location	Any action involving construction of facilities or management of property in wetlands must avoid adverse selfects on the wetlands, minimize potential harm, and preserve and enhance the wetlands, to the extent possible
60 Feel: Reg. 15366 (March 23, 1995). amending 40 CFR Parl 9, 122, 123, 131 and 132 - Water Quality Guidance for the Great Lakes Hystem	TBC'	This final guidance sets forth various water quality criteria and procedures to protect the Great I also bystem from further degradation from contamination
42 USC \$\$ 7401 ot seq Clean Air Act	Chemical Action Location	This act regulates air emissions from mobile and stationary air pollution sources
42 USC § 7409, 40 CER Part 50 National Primary and Secondary Ambient Air Quality Standards	Chemical Action	These provisions establish amibient air quality standards for the protestion of public health and wellare
42 USC 7412 - Hazardous Air Pollulants	Chemical Action	These provisions require USEPA to establish emission standards for hazardous air pullutants, however, regulations have not yet been promulgated or proposed to implement this statutory provision
42 USC 7511 and 7512 - Non-Attainment Provisions for Ozone and Carbon Monoxide	Location Action	These provisions provide additional regulation of stationary sources in one attainment areas

### Enclosure 1

Ohio Environmental Protection Agency
Potential Applicable or Relevant and Appropriate Requirements (ARARs)
for Greiner's Lagoon Removal Action

January 22, 1998

### OREINERS LAGOON

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\$18 O2		EIMAINDERED PLAINT RPI CHB	Probible removal or destruction of endangered plant species (seins private property secuptions)	Applies to remediation along where chambels may line montengered operior. Creaty establishes that receptor plant special must be considered in the secessing its. This act may require entertain of audangered specials in remediations that knows movement or displacement at large volumes of surface sell.	
E 451 00		CONSTRUCTION PERMITS FOR DAME, HIKES AND LEVEPS	NO DAM MAY BE CONSTRUCTED FOR THE PURPORE OF REDRING, CONSERVING OR REFARDING WATER, OR FOR ANY OTHER TYMPOSE, BIOR WHALL ANY WEED REVEL BE CONSTRUCTED FURTHER PURPOSE ORVERTIBLE OR RETARNING FLOOD WATER WISHOUT A PERMIT	REMEDIES THAT WILL CREATE OR ALTER A DAM, DIKE OR LEVER	AC TION
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1704 08	A ;	PROMINES VIOLATION OF AIR POLICISION CONTROL BUILES	PROHIBITA EMICRICIE OF AN ARE CONTAMINANT REVINERTON REC 3704 OR ANY RULFE, PERMIT, ORDER DIE VARIANGE SEURN PURBNARIE TO THAT GECTION OF THE CIRC	MAY PERTAIN TO ANY BITE WHERE PAIGHOUS DE AN AM CONTAINNAIR OCCURS SITUES AS A PRESENTE COMMITTON OF SHE SIDE OR AS A RESULT OF REMEDIAL ACTIVITIES SHOULD BE CONSIDERED FOR VIRTUALLY ALL SITES	ACTION
1714 07 Or Or	tai	ENFANT RAIL & CHACA OF PROPERTY OF PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF	PROVINGS AUTHORITY AND LODRISSIONS BY WHICH THE DIRECTOR MAY FRANCE ANY ELRODN FROM PERMITTING OR OTHER REQUIREMENTS GOVERNING THE GENERATION, STORAGE, THANKEORS OR DISPUSAL OF SOUR OLDBACKNOUL WASTE.	PERTAINS TO ANY RITE AT WHICH SOLID OR BIAPANDOUS WA'TE HAS COME TO BE LECCATED. CERTAIN ALBERT OF IGNE TO BE LECCATED. CERTAIN ALBERT OF SOLID AND THAT ALBERT ACTIVITIES PEOULD THE PEOULD THAT ALBERT ACTIVITIES DECUMENT THE ALBERT OF SOLID AND COLOR OF THE ONLY OF SOLID AND COLOR OF THE OWN THAT ALBERT OF SOLID AND COLOR OF THE OWN THAT ALBERT OF SOLID AND COLOR OF THE OWN THAT ALBERT OF SOLID AND COLOR OF THE OWN THAT ALBERT OF SOLID AND COLOR OF THE OWN THAT ALBERT OF SOLID AND COLOR OF THE OWN THAT ALBERT OF SOLID AND COLOR OF THE OWN THAT ALBERT OF SOLID AND COLOR OF THE OWN THAT ALBERT OF SOLID AND COLOR OF THE OWN THAT ALBERT OF SOLID AND COLOR OF THE OWN THAT ALBERT OF THE OWN THAT ALBERT OF THE OWN THAT ALBERT OF THE OWN THAT ALBERT OF THE OWN THAT ALBERT OF THE OWN THAT ALBERT OF THE OWN THAT ALBERT OF THE OWN THAT ALBERT OF THE OWN THAT ALBERT OF THE OWN THAT ALBERT OF THE OWN THAT ALBERT OF THE OWN THAT ALBERT OWN THAT ALBERT OWN THE OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBERT OWN THAT ALBER	ACTION
OHIO EPA DE	(14)	POURTY WAS LOCATED PACIFITY WAS TE	ERLING, GRADING, EKCAVATING, BUKUNG, UNKERIO ON MINING ON LAND WASTE FACILITY WAS OPERATED IS FROMBLED WITHOUT PRIOR AUTHORIZATION FROM THE DIRECTOR OF THE OHIO SPA.	PERTAINS TO ANY BITE AT WHICH HAZARDRUS OR BOLID WASTE HAS COME TO BE LOCATED. CERTAIN ALTERNATIVES INCLUSY EXCAVATION ACTIVITIES WHICH MAY HICOMPTO TO THE ACTIVITIES THOUGH THOSE ACTIVITIES BE OF THE MAINAGEMENT OF SOLIBIRATARDOUS WASTES ON SITE, AN EXEMPTION TO PERMITTING AND OTHER REQUIREMENTS MAY BE WARRANTED.	LOCATION ACTION
E 3774.02	es	AIR EMISSIONS FROM HAZARDOUR WASTS FACILITIES	NO INTERIOUS WARTE FACHITY SHALL FIME ANY PARTICULATE MATTER, DUST, FUMES, DAS, MIST, SAIDKE, VAFOR OR ODDOROUS SUBSTANCE THAT INTERESTS WITH THE COMFORTABLE ENJOYMENT OF LIFE OR PROPERTY OR IS INJURIOUS TO PUBLIC HEALTH	PERTAINE TO ANY SIZE AT WHICH HATARDOUS WASTE WILL BE MANAGED SUCH THAT AIR ENTIRSIONS MAY OCCUR. CONSIDER FOR SITES THAT WILL UNDERGO MOVEMENT OF EARTH OR INCHIBRATION.	
7 2734 65 E		PROHIBITS OPEN DUMPING OR BURNING	PROHIBITE OPEN BURNING OR OPEN DUKIMNO OF SOLID WARTE OR TREATED OR UNITREATED INFECTIOUS WASTE.	PERTAINS TO ANY SITE AT WHICH ROLID WASTE HAR COME TO BE LOCATED OR WILL BE DENERATED DURING A REMEDIAL ACTION.	ACTION LOCATION
4 0 0 0 0 0 0 0 0	A.C,D,Q	EXPLOSIVE GAS MONITORING	NEDUIRER EXM ORIVE GAS MONITORING PLAIRS FOR RANITARY LANDFILLS AND PROVIDES AUTHORITY TO THE DIRECTOR OF OHIO EPA TO ORDER AN OWNER OR OPERATOR OF A FACILITY TO IMPLEMENT AN EXPLOSIVE GAS. MONITORING AND REPORTING PLAIR	PERTAINS TO ALL BANTARY LANDITILS EXCEPT FOR THOSE THAT DISPOSED OF HONPUTALSCIBLE WASTES.	LOCATION ACTION
Z 5 3734 08	(D)(6)(e)	HAZARDOUS WASTE FACILITY ENVIRONMENTAL	A HAZARDOUS WARTE FACILITY INSTALLATION AND OPERATION PERMIT SHALL NOT BE APPROVED UNLESS IT PROVES THAT THE	PERTAINS TO ALL SITER AT WHICH HAZARDOUS WASTE HAS COME TO BE LOCATED AND/OR AT WHICH HAZARDOUS WASTE WILL BE	

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M LEVISED CODE C SECTION	PERTINENT PARAGRAPH	TITLE OR SUBJECT OF REGULATION	DESCRIPTION OF REGULATION	APPLICATION OF REGULATION	ARAR 1YPE
			FACILITY REPRESENTS THE MINIMUM ADVERGE ENVIRONMENTAL IMPACT, CONSIDERING THE STATE OF AVAILABLE TECHNOLOGY, THE NATURE AND ECONOMICS OF VARIOUS ALTERNATIVES AND OTHER PERTINENT CONSIDERATIONS.	TREATED, FFORED OR DISPOSED OF. MAY FUNCTION AS SITING CHITERIA.	
.734 06	(Diā,d,g h	HAZARDOUG WAGTE SITHIQ CRITERIA	(B),6,d. A HAZARDOUS WASTE FACILITY INSTALLATION AND DPERATION PERMIT SHALL NOT BL APPHOVED WILLSS IT PROVES THAT THE FACILITY	PERTAINS TO ALL SITES AT WHICH HAZARDOUS WASTE HAS COME TO BE LOCATED ANDION AF WHICH HAZARDOUS WILL BE THEATED, STOREO OR DISPOSED OF. MAY FUNCTION AS SITING CHITERIA.	ACTION LOCATION
3734.14 1		CONDITIONS FOR DISPOSAL OF ACUTE HAZARIDOUS WAGTE	PROHIBITE DISPOSAL OF ACUTE HAZAROOUS WASTE UNLESS IT: [1] CANNOT BE TREATED, RECYCLED OR DESTROYED, (2] HAS BEEN REDUCED TO ITS LOWEST LEVEL OF TOXICITY; AND (3) HAS BEEN COMPLETELY ENCAPSULATED OR PROTECTED TO PREVENT LEACHING.	PERTAINS TO ANY BITE WHERE ACUTE HAZARDOUS WASTE HAS COME TO BE LOCATED.	CHEMICAL ACTION
요 요 _{3767 13} 의		PROHIBITION OF MUISANCES	PROHIBITS NOXIOUS EXHALATIONS OR SMELLS AND THE OBSTRUCTION OF WATERWAYS.	PENTAINS TO ANY SITE THAT MAY HAVE NOXIDIES SMELLS OR MAY OBSTRUCT WATERWAYS.	ACTION CHEMICAL
☑ ① 3787.14 Ⅲ		PROHIBITION OF NUISANCES	PROHIBITION AGAINST THROWING REFUSE, OIL, OR FILTH INTO LAKES, STHEAMS, OR GRAINS.	, PERYAINS TO ALL SITES LOCATED ADJACENT TO LAKES, STREAMS, ON DRAINS.	. ACTION CHEMICAL
O 6101.19 I		CONSERVANCY DISTRETS	BOARD OF DIRECTORS OF A CONSERVANCY DISTRICT MAY MAKE AND ENFORCE RIMES AND REGULATIONS PERTAINING TO CHANNELS. DITCHES, PIPES, SEWERS, ETC.	THIS STATUTE PERTAINS TO ANY SITE THAT MAY AFFECT A CONSTRUCTION WITHIN A CONSERVANCY DISTRICT.	могра
五 以 () () () () ()		ACTE OF POLLUTION PROHIBITED	POLLUTION OF WATERS OF THE STATE IS PROHIBITED.	PERTAINS TO ANY SITE WHICH HAS CONTAMINATED ON-SITE CIRCUMS ON SURFACE WATER OR WILL HAVE A DISCHARGE TO ON SILL SURFACE OR CROUND WATER.	ACTION
ማ ማ ። 6111.04.2 ጠ		RULES REQUIRING COMPLIANCE WITH NATIONAL EFFLUENT \$105	ESTABLISHES REQULATIONS REQUIRING COMPLIANCE WITH NATIONAL EFFLUENT STANDARDS.	L PENTAINS TO ANY SITE WHICH WILL HAVE A POINT FOUNCE DIBCHARGE.	ACTION
0 4111.07 0 1	A,C	WATER POLLUTION CONTROL REQUIREMENTS - BUTY TO COMPLY	PROHIBITS FAILURE TO COMPLY WITH REQUIREMENTS OF SECTIONS 6111.01 TO 6111.08 OR ANY MULES, PERMIT OIL ORDER ISSUED UNDER THOSE SECTIONS.	PERTAINS TO ANY SITE WHICH HAS CONTAMINATED GROUND VALEE OR SCHEACE WATER OR WILL HAVE A DISCHARGE TO ON-SITE EUREACE OH OROUND WATER.	ногод

### OHO ADMINISTRATIVE CODE (O' ARARIE GREWER'S LAGOON

ACE	ADMINIS. CODE SECTION	PERTIMENT PARAGRAPH	TITLE OR BUBLECT OF REGULATION	DESCRIPTION OF REGULATION	APPLICATION OF REGULATION	AMAR TYPE
Δ,	1601 18 1	<b>93</b> , A	LIST OF ENDANGERED PLANT SPECKS	PLANT BPECIES CUNSINSMEN ENGANGENED NI GING	May apply at consideration after where chamical release threaters.  Nated epocles: Should also be considered where consideration activities may decupt highliets.	·
3146	1801;14 3	3-11	SDM AHD DRAWADE	RECUMBMENTS FOR RECLAMATION OF SUMPACE MINED AREAS ISOLATION OF ACED DRAINAGE, RESTRICTION OF SUMFACE WATER MAPOUNDMENTS, RULES FOR USE OF EXPLOSIVE 5, PROTECTION OF ENDERGROUND WATER SUPPLIES, SAFETY OF INGLIMALES, RESER SIG, REVELLETATION, DAME AND DIVERSIONS.	CONSIDER FOR SITES WITH SOR BORBOW AREAS OR EXTENSIVE EXCAVATION	
644-3	1501 14 4	1 3	GEOLOGICAL SURVEYS	REQUINCES SURVEY AND OTHER INFORMATION FOR SURFACE MINITIU	CONSIDER FOR SITE WITH BORROW SOURCE AREA OR EXTENSIVE EXCAVATION	
:5 614-	1601 21 21	0304 1	DEEK REICY AND DAM OF DAME, DIKES AND LEVES	DAMS, DIKES AND ESVERS MUST BE OPERATED SAFELY REPAIRS OR OTHER REMEDIAL PALABURES STATE BE FEBRUARIST OF LAMB THESE AND LEVESS AS SECTESSARY TO SAFEGUARIS LIST. HE ALTHERS PROPERTY.	PERSANNE SO REMEDIES THAT CREATE ON ALTER A DAM, DIKE OR LEVEL - CONSIDER SOIL SHEES WHITE ON SHEE SURPACE WATER AND FOR SHEES WHITEIN A SECUNDES AND	ACTION
	1801 21 23	01, A \$	LIET OF ENDANGENED ANNAAL FELCIES	Line of Ohlo wrimpl apocies considered and engered.	May apply to re-indicators allow where Helod species are timestened by chemical to shay also apply at also where remade this could distinct existing heldfalls.	
	3746 1 03		AHALYTH AL AND COLLECTION PROCEDURES	SPECIFIES ANALYSICAL METHODS AND COLLECTION PROCESSIVES FUN NUMPACE WATER DISCHARGES	PERTANIS TO BOTH DISCHARDES TO SHIP ACE WATERS AS A RESULT OF REMEDIATION AND ART DITSTILL SURFACE WATERS AFFECTED BY SITE CONDITIONS	ACTION
A DERR	3746 1 04	A.,8 C.D.€	THE "FIVE FREEDOMS" FOR SURFACE WATER	ALL BURPACE WATERS OF THE STATE SHALL BE PILE FROM AL OBJECTIONAL SUBPERINED SOLUS BIFLOATING DEBRIS, URL AND SCUM CLIAMTERIALS THAT CREATE A MINBANCE D) TOXIC, HARMFUL OR LETHAL SUBSTANCES. E) RUTRIERET THAT CREATE MINBANCE (BROWER)	PERTAINS TO BOTH DISCREARGES TO SURFACE WATERS AS A RESULT OF REMIDIATION AND ANY ON SILE SURFACE WATERS AFFECTED BY SITE CONDITIONS	CAMMICAL
HOM OHIG EPA	374 <b>8</b> 1 0b	A,B,C	ANTIDERHADATION FOLICY FUR SURPACE WATER	PREVENTS DEGRADATION OF SURFACE WATER QUALITY SELDW DESIGNATED USE OR EXISTING WATER QUALITY. EXISTING WATER AND USES SHALL SE MANIFAMED AND PHOTECTED. THE MOST STRUCKET CONTROLS FOR TREATMENT SHALL SE REQUIRED BY THE DIRECTOR TO SE EMPLOYED FOR ALL HEW AIM EXISTING PRINT SOURCE DISCHARGES. PREVENTS ANY DEGRADATION OF "GTATLINE GOVERNE WATERS".	RECHINES THAT BEST AVAILABLE TECHNOLOGY (BAT) BE USED TO THE AT SURPACE WATER DISHARDES. DWOPA USES THIS RULE TO SET STAINDARDS WHEN EXISTING WATER QUALITY IS BETTER THAIR THE DESIGNATED USE.	C HE MIC AL
45 F	3745 1 07	c	WATER OUALITY CRITERIA	ESTABLISHES WATER QUALITY CRITERIA FOR POLITIEANES WHICHERO NOT HAVE SPECIFIC NUMERICAL OR MARRATIVE CHITERIA IDERTIFIED IN TABLES 7-1 THROUGH 7-15 OF THIS RULE.	PERTAINS TO SOTH DISCHARGES TO SURFACE WATERS AS A RESULT OF HEMICOLAL ACTION AND ANY SURFACE WATERS AFFIC TED BY SITE CONDITIONS.	CHEMICAL
14-98 13	3746-1-12		water use des for Bandusky river	EBTABLISHES WATER USE DESIGNATIONS FOR STILLAM SEMALNITS WITHIN THE SANDUSKY RIVER BASIN.	PERTINENT IF STREAM OR STREAM SEGMENT IS ON SITE AND IS EITHER AFFECTED BY SITE CONDITIONS OF IF REMEDY INCLUDES DIRECT DISCHARGE. USED BY DWOPA TO ESTABLISH WASTE SUAD ALLICATIONS.	ACTION L

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ADMINIS. PRATIMENT TITLE OR SUBJECT DESCRIPTION **APPLICATION** ARAR CODE **PARAGRAPH** Ö OF REGULATION OF REGULATION OF REQULATION TYPE SECTION Ω. PERTINEUT IF STREAM OR STREAM SEGMENT IS ON-SITE AND IS J745-1-31 WATER USE DES FOR LAKE ERIE ESTABLISHES WATER USE DESIGNATIONS FOR STREAM SEGMENTS ACTION EITHER AFFECTED BY SITE CONDITIONS OF IF REMEDY INCLUDES LOCATION WITHIN THE LAKE ENE BAGIN. DIRECT DISCHARGE. USED BY DWOPA TO ESTABLISH WASTE LOAD ALLOCATIONS. PERTAINS TO ANY SITE WHICH UTILIZES OR WILL UTRIZE AIR ACTION 3746-15-06 A1,A2 MARITURCTION & MARITENANCE OF AIR ESTABLISHED SCHEDULED MAINTENANCE AND SPECIFIES WIREN PULL CONTROL EQUIPMENT POLLUTION SOURCE MUST BE SHUT DOWN DURING MAINTENANCE PULLUTION CONTROL EQUIPMENT ON GITE. ø 4 ACTION DEFINES AIR POLLLITION NUIGANCE AS AG THE EMISSION OR ESCAPE PERTAINS TO ANY SITE WHICH CAUSES, OR MAY REASONABLY AM POLLUTION NUISANCES PROHIBITED 3746-15 07 CAUSE, AIR POLLUTION NUISANCES. CONSIDER FOR SITES THAT INTO THE AIR FROM ANY SOURCESS) OF SMOKE, ASHES, DUST, DIRT, WILL UNDERGO EXCAVATION, DEMOLISION, CAP INSTALLATION, 4 GRIME, ACIDS, FURIES, GASES, VAPORS, ODORS AND COMBINATIONS METHANE PRODUCTION, CLEARING AND GRUBBING, WATER q. OF THE ABOVE THAT ENDANGER HEALTH, SAFETY ON WELFARE OF THE THEATMEIST, INCINERATION AND TRASTE FUEL RECOVERY. MIBLIC OR CAUSE PERSONAL INJURY ON PROPERTY DAMAGE. SUCH 4 HUISANCES ARE PROHIBITED. w PERTAINS TO ANY SITE THAT HAS OR WILL HAVE AN AIR ACTION ESTABLISHES ALLOWABLE STACK HEIGHT FOR AIR CONTAMINANT STACK HEIGHT REQUIREMENTS 3745-16-02 B,C CONTAMINANT SOURCE ON-SITE IPARTICULATE, DUST, FUMES. Ω SOURCES BASED ON GOOD ENGINEERING PRACTICE. GAS, MIGT, SMOKE, VAPOR, ODORSI EMITTED FROM A STACK. CONSIDER FOR REMEDIES INCORPORATING INCINERATION, WASTE FRIEL RECOVERY AND WASTEWATER TREATMENT. PERTAINS TO ANY SITE THAT MAY EMIT MEASURABLE CHEMICAL ESTABLISHES SPECIFIC STANDARDS FOR TOTAL SUSPENDED 3745-17-02 A.B,C PARTICULATE AMBIENT AIR OHALITY QUARTITIES OF PARTICULATE MATTER (BOTH STACK AND STANDARDS PARTICULATES. FUGITIVEL DONSIDER FOR BITES THAT WILL UNDERGO EXCAVATION, DEMOLITION, CAP HISTALIATION, CLEARNIG AND GRUBBING, INCINERATION AND WASTE FUEL RECOVERY. PERTAINS TO SITES IN CERTAIN LOCATIONS THAT MAY EMIT OR CHEMICAL DEGRADATION OF AIR QUALITY IN ANY AREA WHERE AIR QUALITY IS PARTICULATE NON-DEGRADATION LOCATION 3748-17-05 ALLOW THE ESCAPE OF PARTICULATES INDTHI STACK AND BETTER THAN REQUIRED BY 3745-17-02 IS PHOTHISTED DERR FUGITIVEL. CONSIDER FOR SITES THAT WILL UNDERGO EXCAVATION, DEMOLITION, CAP INSTALLATION, CLEARING AND GRUBBING, HICINERATION. EPA PERTAINS TO ANY EMISSION OF PARTICULATE FROM A STACK. CHEMICAL SPECIFIES THE ALLOWABLE OPACITY FOR PARTICULATE EMISSIONS; VISIBLE PARTICULATE EMISSION CONSIDER FOR HICINERATION AND FUEL BURNING. 3748-17 07 A-D PROVIDES EXCEPTIONS FOR UNCOMBINED WATER. ٥ CONTROL START-UP/SHUTDOWN OF FUEL BURNING EQUIPMENT, MALFURCTIONS. OHI PERTANS TO SITES WHICH MAY HAVE PUGITIVE EMISSIONS ACTION ALL EMISSIONS OF FUGITIVE DUST SHALL BE CONTROLLED. EMISSION RESTRICTIONS FOR FUGITIVE MON STACK) OF DUST. CONSIDER FOR SHES THAT WILL 3745-17-08 A1,A2,B,D 20 UMBERGO GRADING, LOADING OPERATIONS, DEMOLITION, **DUS1** ũ CLEARING AND GHUBBHIG AND CONSTRUCTION. Щ **ACTION** PERTAINS TO ANY HEMEDY INCORPORATING INCINERATION ESTABLISHES PARTICULATE EMISSION LIMITATIONS AIN) INCHERATUR PARTIC EMISSION & ODOR A,B,C J 3746-17-09 DESIGN OPERATION REQUIREMENTS TO PREVENT THE EMISSION OF RESTRICTIONS n OBJECTIONALME ODORS. ACTION PENTAINS TO ANY REMEDY INCORPORATING FUEL BURNING ESTABLISHES PARTICULATE EMISSION LUMITATIONS FOR FUEL BUINNING FUEL BURNING PARTIC EMISSION A,0,C INVASTE FUEL RECOVERY). 3746-17-10 m EQUIPMENT. RESTRICTIONS

### OHO ADMINISTRATIVE CODE GREINER'S LAGOON

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i d		PERTINENT PARAGHAPH	TITLE OR EUBJECT OF REQULATION	DESCRIPTION OF REGULATION	APPLICATION OF REGULATION	ARAR 1 YPE
	1716 10 02	A 0.C,D	BULFUR DIOXIDE AMBIENT AIR GUALITY BORADRAFE	ENTAM ISING PRIMARY AND SECONDARY AMBIGUE AN GUALITY STANDARDS FOR SIX FUN CIXI KINE,	PERFAMS TO ABY SITE THAT FIRST OR WILL EMIT SURFING INASTE FIRE RECOVERY.	ACTION CHEMIC AL
	3744 18 04	A.B,G,#,P	SUM MIN DIOXIDE MEASUREMENT METHODS AND PROCEDURES	epecume terthiq methods and procedimes i on bilitum inidiame Emistiches compliaines teethiq	PERTAINS TO ANY SITE THAT WILL SMIT SULFUR DIGNIOS CONSIDER FOR SITES THAT WILL LITELTS INCUIENATION OR FULS RECOVERY IWASTE FULL RECOVERY).	ACTION CHEMICAL
4+314E		<b>A</b>	BULFUR DIOXIDE AMBIERE MONTORNO MECHINEMENT STATE	THE DIRECTOR OF THE OHRO EPA MAY RECHREE ANY SOURCE OF BULFUN DIOXIDE EMISSIONS TO INSTALL, OPERATE ANY MAINTAIN MONITORING DEVICES, MAINTAIN RECORDS AND FIRE REPORTS	PERTAINS TO ANY SITE THAT EMITS OR WILL SMIT SULFUN IMPHRIS CUMBINER FOR MIGHERATORI, SURE SURNING INVASTS FIRE RECOVERY).	ACTION CHEMILAL
\$ 1 <b>6</b> 4 <b>6</b> 4	3746 18 08	A G	EULFUL DIOXIDE EMISSION CHAIT PIOVISIONS	PERSONAL LINES PROPRIETABLE STATE OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF STATES OF	PARTAME TO ANY SITE THAT WAS SMIT SUSUR DIOXIDS CONSIDER FOR SITES THAT WILL SITUENCO WE HERATION OR FIRE BUMMING IWASTS FUSE RECOVERY!	ACTION FREIAICAL
 0	3/46 19 04	A,B,C,D	DPEN BURNING STAIRDAINTS IN LUINTSTRICTED AREAS	OPEN BURNMIG WITHOUT FROM TUTAL ROUND MONTH OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF	PERFAMS TO SHES WITHIN AN UNRESTRICTED AREA (OUTSIDE THE BUINDARY OF A MUNICIPALITY AND A FORE SKTENDING REYOND SUCH MUNICIPALITY).	LOCATION ACTION
	J74 <b>5</b> -20-07	A.0 C	STANDARD FOR IMACTIVE ASSESTED WAJIE DISPUSAL SITES	BRABLISHES EMBSIONS AND IARMITEMANCE STANDAMIS FOR HIACTEVE ABRESTOG WARTE DIEMSSAL SITES	PERTARIS TO SITES WHERE ASSESTES HAS COME TO SE LOCATED CONSIDER FOR LANDRILE WITH INADEQUATE COVER OR WHERE WASTES WILL CONSQUIDATED	CHAIRCAL
	3746 24 92	A E.C	AMBIENT AIR DUALITY CJANDARDS AND GUNTERWES	ESTABLIBLIES SPECIFIC AIR QUALITY STANDARDS FOR CARBON MOHOXIDE, OZUNE AND AND HON METHANIE HYDROCARBONS	PENTANIS TO ANY SITE WINCH WILL EMIT CARBON OXIDES, OZONE OR HOM METHAND HYDROCARBONS CONSIDER FOR SITES THAT WILL UMBERIOD WATER TREATMENT, INCHIRATION AND FUEL BURNING (WASTE FUR. RECOVERY)	CHRANCAL
PA DERR	2746 21 03	<b>0</b> ,0 <b>0</b>	METHODS OF AMBIENT AIR QUALITY MEABUREMENT	SPECIFIES MEASUREMENT METHODS TO DETERMINE AMBIENT AIR QUALITY FOR THE FOLLOWIND CONSTITUENTS. CARRIED MORIOGRAPH, OZDRE AIRO NON METHANE HYDROCARBURS.	FERTAINS TO ANY SITE WHICH WILL EMIT CARBON MANOXIDE, OJOHE OR HON METHANE HYDROCAMONS. CONSIDER FOR FOR SITES YOUR FERTAINENT SYSTEMS WILL RESULT III AIR EMISSIONS	CHEMICAL
OHIO EF	3748 21-05		NON DEGRADATION POLICY	PROBBITS SIGNIFICANT AND AVOIDABLE DEFENIORATION OF AIR GUALITY.	PERTAINS TO ANY SITE WHICH WILL EMIT CARBON OXIDES, CARBON OXIDES, AND NON METHANS HYDROCARBONS CONSIDER FOR SITES THAT WILL UNDERGO WATER TREATMENT, WICHNERSTIN AND FUEL BURNING (WASTE FUEL RECOVERY)	ACTION
6 FROM	3746 21-07	A,B.O.LJ	ORGANIC MATERIAL B EMISSION CONTROL: STATIONARY SOUNCES	MEQUINES CONTROL OF EMISSIONS OF DISGASSC MATERIALS FROM STATIONARY SOURCES RESIMINES SEST AVAILABLE RECIBION DOLY	PENTANIG TO ANY SITE WHICH IS EMITTING OR WILL EMIT CHOOSING MATERIAL. CONSIDER FOR SITES THAT WILL UNDERGO WATER THE ATMENT JAIR STRIPPINOS, HICHSERATION AND FUEL BURISHIO (WASTE FUEL RECOVERY)	CHEMN AL
98 13 4	3745-21 QB	A-B	Carbon Monoxide Emission Control: Stationary Soirces	REQUIRES ANY STATIONARY SOURCE OF CARBOIL MONIOXRIE TO MINIMIZE EMISIONS BY THE LISE OF BLET AVAILABLE CONTROL TECHNOLOGIES AND OPERATING PRACTICES BY ACCORDANCE WITH BEST CHARLIST TECHNOLOGY.	PERFAMB TO ANY BITE WHICH IS EMITTING OR WILL EMIT CANDON MONDAIDE. CONSIDER FOR BITES THAT WILL UNDERGO WATER THEATINEMT, INCINERATION AND FUEL BURNING IWAS LEFUEL RÉCOVERY).	ACTION CHEMICAL
-14-	3745-21-00		VIIC EMISSIONS CUNTROL: STATIONARY SOURCES	ESTABLISHES LIMITATIONS FOR EMISSIONS OF VOLATILE ORGANIC COMPOUNDS FROM STATIONARY SOURCES.		HOITSA

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ADMINIS. PERTINENT CODE TITLE OR SUBJECT DESCRIPTION APPLICATION HARAGRAPH ğ ARAR SECTION OF REGULATION OF REGULATION OF REGULATION TYPE D. 3145-23 01 HITROGEN DIOXIDE AMBIENT AIR ESTABLISHES A MAXIMUM AMBIENT AIR QUALITY STANDARD FOR PERTAINS TO ANY SITE WHICH IS EMITTING OR WILL EMIT CHEMICAL QUALITY STANDARDS NITROGEN DIOXIDE. NITROGEN DIOXIDE. CONSIDER FOR SITES THAT WILL UNDERGO ACTION WATER TREATMENT, DICHERATION AND FUEL BURNING WASTE FUEL RECOVERYL 3745-23-02 A.D MEASUREMENT METHODS FOR SPECIFIES METRIODS OF MEASUREMENT FOR INTROGEN DIOXIDE TO PERTAINS TO ANY SITE WHICH WILL EMIT NITRIGEN DIOXIDE. **ACTION** HITROGEN DIOXIDE DETERMINE AMBIENT AIR QUALITY. CONSIDER FOR SITES WHERE TREATMENT SYSTEMS MAY RESULT CHEMICAL ω IN NITROGEN DIOXIDE EMISSIONS, EGF. THERMAL TREATMENT 4. SYSTEMS. n 3745 23-04 NITROGEN DIOXIDE HONDEGRADATION PROHIBITS THE SIGNIFICANT AND AVOIDABLE DETERIORATION OF AIR PERTAINS TO ANY SITE WHICH IS EASITTING OR WILL EMIT ACTION 4 POLICY QUALITY BY THE HELEASE OF NITROGEN DIOXIDE EMISSIONS. WITHOGEN DIGNINE. CONSIDER FOR SITES THAT WILL UNDERGO CHEMICAL 64 WATER TREATMENT, INCINERATION AND FUEL BURRING AVASTE FUEL RECOVERY! 4 3746-23-06 INTHOGEN OXIDES EMISSION REGINRES THAT ALL STATIONARY BOURCES OF HITROGEN OXINE PERTAINS TO ANY SITE WHICH WILL EMIT NITROGEN OXIDES. ACTION CONTROLS: STATIONARY SOURCE MINIMUZE EMISSIONS BY THE USE OF THE LATEST AVAILABLE CONTROL CONSIDER FOR SITES WHERE TREATMENT SYSTEMS WILL REBULT CHEMI, AL Ω TECHNIQUES AND OPERATING PRACTICES IN ACCOMMANCE WITH BEST IN NURGORN OXIDE PAISSIONS, ESP. THEHMAL TREATMENT. CUIMENT TECHNOLOGY. ESTABLISHES LIMIT FOR INTROGEN ONDE EMISSIONS FROM COMBUSTION. 3748-26-03 EMISSION CONTROL ACTION PROGRAMS RECLIRES PREPARATION FOR AIR POLLUTION ALERTS, WARRINGS AND PERTAINS TO ANY SITE WHICH IS EMITTING OR MAY EMIT ALL ACTION EMERGENCIES. CONTAMINABLES. 3745-27-03 EXEMPTIONS TO GOLID WASTE PERTAINS TO ANY GITE AT WHICH SOLID WASTE WILL BE ACTION DEFINES EXEMPTIONS TO SOLID WASTE REGULATIONS AND REGULATIONS ESTABLISHES LIMITATIONS ON TEMPORARY STORAGE OF PUTRESCIBLE MANAGED. CONSIDER ESPECIALLY FOR OLD LANDFILLS WHERE SOLID WASTE MAY BE EXCAVATED AND/OR CONSOLIDATED. WASTE OR ANY BOLID WASTE WHICH CAUSES A NUISANCE OR HEALTH HAZARD. STORAGE OF PHIRESCIBLE WASTE BEYDND SEVEN DAYS IS S S CONSIDERED OPEN DUMPING. ACTION 3746-27-06 PERTABLE TO ANY SITE AT WHICH SOLID WASTER WILL BE A,B,C ESTABLISHES ALLOWABLE METHODS OF BOLID WASTE DISPOSAL; AUTHORIZED, LIMITED & PROHIBITED MANAGED. PROHIBITS MANAGEMENT BY OPEN BURNING AND 4 SOLIO WASTE DISPOSAL SANITARY LANDFILL, INCINERATION, COMPOSTING, PROHIBITS a. MANAGEMENT BY OPEN BURNING AND OPEN DUMPING OPEN DUMPRIO. ш THIS PARAGRAPH PRESENTS BUBBTANTIVE REQUIREMENTS OF A O 3746-27 08 B.C REQUIRED TECHNICAL INFORMATION SPECIFIES THE MINIMUM TECHNICAL INFORMATION REQUIRED OF A SOLID WASTE PERMIT TO INSTALL. FERTAINS TO ANY NEW GOLD SOLID WASTE PERMIT TO INSTALL. INCLUDED AND A HYDROGEOLOGIC FOR SAMITARY LAMPRILS I O WASTE DIBPOSAL FACILITY CREATED ON SITE AND EXPANSIONS INVESTIGATION REPORT, LEACHATE PRODUCTION AND INIGRATION OF EXISTING SOLID WASTE LANDFILLS . ALSO PERTAINS TO INFORMATION, BURFACE WATER DISCHARGE INFORMATION, DESIGN Σ EXISTING AREAS OF CONTAMPIATION THAT ARE CAPPED PER CALCULATIONS, PLAN DRAWINGS. ົດ SOLID WASTE BUILES . THIS RULE ESTABLISHES THE MINIMUM Œ. INFORMATION HE GUINED DURING THE REMEDIAL DESIGN STAGE. Щ THIS RULE PREVENTS THE ESTABLISHMENT OF NEW SOLID WASTE COCATION 3745 27-07 SPECIFIES LOCATIONS IN WHICH BOLID WASTE LANDFILLS ARE NOT TO 4 **LOCATION CRITERIA FOR SOLID WASTE** LANDHILLS AND EXPANSIONS OF EXISTING SOLID WASTE BE BITED. INCLUDES FLOODPLANS, SAND OR GRAVEL PITS, LIMESTONE DISPOBAL PERMIT m LANDFILLS IN CERTAIN UNFAVORABLE LOCATIONS. ALSO MAY OR SANDSTONE QUARMES, AREAS ABOVE SOLE SOUNCE ADDITIONS. PROHIBIT THE LEAVING OF WASTE IN PLACE IN CERTAIN WETLANDS, ETC. D UNFAVORABLE LOCATIONS. a) LOCATION PERTAINS TO NEW SANITARY LANDFILLS FOR SOLID WASTE ADDITIONAL SITING REQUIREMENS WITH RESPECT TO GEOLOGY. 4 3741-27-07 D,F,G,H ADDITIONAL CRITERIA FOR SANIYARY ACTION DISPOSAL AND EXPANSIONS OF EXISTING FACILITIES WATER SUPPLIES, OCCUPIED PROPERTIES, PARKLANDS AND MINE LANDFILL APPROVAL

**GUBSIDENCE AREAS.** GOVERNS EXPANSION OF EXISTING SITES

#### ONO ADMINISTRATIVE CODE ( AHAR GREINER'S LAGOON

ACE	ADMINIS CODE SECTION	PERTINENT PARAGRAMI	TITLE OR BUBJECT OF REGULATION	DESCRIPTION OF REGULATION	APPLICATION OF REGULATION	AMAH Type
α.	2/45 27 00	C,D H	CONSTRUCTION SELCHIC ARIONS FOR SAMPANY LANDINGS	DECIMES THE MINIMUM HECHREMENTS FOR THE SOMELAY LAYIND, URANIA AR DRAHAGE LAYER, GEDEVITHERICS, LEACHATE MANAGEMENT SYSTEM, DAS MONIEUMING SYSTEM, ETC. ALSO IDEASE ISHES CONSTRUCTION REMIRRÉMENTS FOR FACRITIES TO SE LOCATED IN GEOLOGICALLY EMPAYORASES AREAS.	PERTAMB TO ANY NEW SOLD WASTE DISPOSAL FACRITY CREATED ON SITE AND ANY EXPANSIONS TO EXISTING SOLID WASTE SANDERS FOR TOMS ALSO PERTAIN TO AREAS OF LUMINAMINATION THAT AND CAPPED PER SOLID WASTE RUISS MAY STRUK AS SITING CRITERIA	ALTION
544-3146	3749-37-10	<b>9</b> , C, A	SAMITARY E MIDFEL GRIUND WATER MUNITORING	ORDIND WATER MONITORING PROGRAM MIRT WE EFFARIBLE! FOR ALL SANITARY LANDLE E PACHLING. THE SYSTEM MIRT CHIEFLE IF A SUPPLIENT HUMBER OF WALES THAT ARE LOCATED SO THAT SAMPLES HUNCATE BOTTE UP ORADIENT HEACKGROUNDLAND DOWNORADILIST WATER SAMPLES. THE SYSTEM MIRE BE DESKINED FOR THE MEMBERS RECHRICATED AND ANALYSIS FIRM LIMITS LIKE OF THE SAMPLES.	PERTAINS TO ANY MEW SOLID WASTE FACE ITY AND ANY EXPANSIONS OF EXISTING SOLID WASTE LAIRPRILS ON SITE, ALSO MAY PERTAIN TO EXISTING AREAS OF CONTAMINATION THAT ARE CAPPED IN PLACE PER THE SOLID WASTE BULES.	ALTION
ŧ	374 <b>5 3</b> 7 11	<b>»</b> G	EMAL CLOSURE OF BAHITARY FAIRHBLE Pach the	REQUIRES CLOBURE OF A LANDIFIL IN A STANMER WHICH MINIMITE THE DISCUSSION OF DESCRIPTION OF A STANDER WHICH STANDARD MAINTENANCE AND MINIMITES.  PUSS CAUBLINE STANKASTINA AND RELIADS OF ELECTRATE AND STANDARD STANDARD STANDARD AND STANDARD AND LEADS OF ELIPSAL WATER STANDARD AND TO SHAND, SON WANNERS LAYER STANDARD AND DISCUSSIONAL AND AND AND AND AND AND AND AND AND AND	SUBSTANTIVE REQUIREMENTS HERTANI TO ANY NEW SOLID WASTE LANDRILS CREATED ON SITE, ANY EXPANSIONS OF EXISTING SOLID WASTE LANDRILS ON SITE AND ANY EXISTING AREAL OF CONTAMINATION THAT ARE CAPPED IN PLACE FEB THE SITEN WASTE RIFELS.	AL TION
X	3146 33 43	A.8 (1.6 AN	EARIEARY EARLIEUL ERILOSIYE GAB MOHIEORING	ESTABLISHES WHILL AN EXPLOSIVE GAS MONITCHING MEALS RECIDINED FOR SOLID VIASTE FAMILIES. SPECIFIES THE SHIPMIMA HIT DIMASTON BODING IN SUCH A MEAN, MICLODING DETAILED THOMSENING MEALS, SPECIFICATIONS BY ORINATION ON GAS CLIMINATION POLITIFIES. BASINETING AND MONITCHING PROCEEDINGS, ETC. MANDATES WINN REPAIRS MISSED MARIE TO AN EXPLOSIVE GAS MONITCHING SYSTEM. THIS RULE ONLY APPLIES TO LAUFLES WHICH HECEVED "PHITHESINE" SOLID WASTES.	PERTANIS TO AITY SIZE WINGSTIAG TRAD DEWILL TRAVE PUTRESCIBLE SOLID WASTES PLACED ON SITE AIRY WINTEN HAS A RESIDENCE ON DITHER OLCOPIED STRUCTURE LOCATED WISHIN HOW FILL OF THE ENIPLACED SOLID WASTE	ACTION
Era S	3745-27-12	1, 4	EXPLOSIVE GAS MONITORINO FOR SANITARY LAIMPRES	IDENTIFIES PARAMETERS AND SCHEMILE FOR EXPLOSIVE DAIL	PLREAING TO ARY DISPOSAL SITE VARFIRE EXPLOSIVE GAS GELIEBATIDIS ARD MIGRATION MAY SE A TIMEAT	CHERNI VE
47 FEOR OHIO E	3749-27 13	c	DISTURBANCES WHERE HAT OR SOLID WASTE FAC WAS OPERATED	REGURALS THAT A DETAILED FLAN BY PROVIDED TO DESCRIBE HOW ARY PROPOSED FRANCE, CRACKED, EXCAVATING, BURKING, DIRECTING, OR MINING ON EARD WRITER A HAZARDOUS WASSE FACILITY OR SOOR WASTE FACILITY WAS OPERATED WIS BY ACCUMULABLED. THE INFORMATION MINES OF MATERIAL THAT THE PROPOSED ACCUMING WAS NOT CREATE A NUISANCE OR ADVENSELY AFFECT THE PROPOSED ACCUMING MEASTER ON THE ENVIRONMENT. SPECIAL TERMS TO CONDUCT SUCH ACCUMING MAY BE IMPOSED BY THE DRILLEON TO PROTECT THE PUBLIC AND THE LIVERDIMENT.	PPHTAINS TO ANY SITE AT WHICHSHAZARIQUE OR SQLID WASTR HAS SEEN MANAGED, SITHER HISPHTIDHALLY OH OTHERWISE. THES NOT PLHTAIN TO ANEAS THAT HAVE HAD ONE TIME 18 AKS THE SPRITE	101.41407
14-98 13	3746-27-14	<b>A</b>	POST-CLOSURE CARE OF SAMITARY LAMOFILE FACILITIES	SPECIFIES THE REQUIRED POST-CLOSURE CARE FOR SOLID WASTE FACILITIES. INCLUDES CONTINUING OPERATION OF LEACHER & AND SAINFACE WATER MANAGEMENT SYSTEMS, MAINTENANCE OF THE CAP SYSTEM AND GROUND WATER MONITORING.	LIBSTANTIVE HEQUIREMENTS PERTAIN TO ANY NEVAY CREATED SOLID WASTE LANDFILLS ON-BITS, ANY EXPANSIONS OF EXISTING SOLID WASTE LANDFILLS ON-SITE AND ANY EXISTING ANEAS DE CAPPED PER THE SOLID WASTE HITES.	ACTION

## OHIO ADMINISTRATIVE CODE (OAC) ARARS GREINER'S OON

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ACE	ADMINIS. CODE SECTION	PERTINENT PARAGRAPH	TITLE OR SUBJECT OF REGULATION	DESCRIPTION OF REGULATION	APPLICATION OF REGULATION	ARAR TYPE
α,	3746-27-18	AD	SOLID WASTE INCINERATOR & COMPUSTING OPERATIONS	ESTABLISHES OPERATIONAL REQUIREMENTS FOR SOLID WASTE INCIDERATORS AND COMPOSTING FACILITIES.	PERTANS TO ANY SITE AT WHICH SOLID WASTE WILL BE EITHER INCINERATED ON COMPOSTED ON-SITE.	ACTION
544+3146	3746-27-19	E	SANITARY LANDFILL GENERAL OPERATIONAL REQUIREMENTS	SPECIFIES GENERAL OPERATIONAL REQUIREMENTS FOR SOLID WASYE LANDFILLS. INCLINDES REQUIREMENTS FOR: PREPARATIONS FOR OPERATING DURING INCLEMENT WEATHER; MANAGEMENT TO MINIMIZE NOISE, DUST AND ODDRS: VECTOR CONTROL; ADEQUATE FIRE CONTROL EQUIPMENT; NOT CAUSING A NUISANCE OR HEALTH HAZARD OR WATER POLLUTION; MINIMIZATION OF DISTURBED AREA; CHEMICAL COMPATABILITY YESTING, IF NECESSARY. SPECIFIES THAT BULK LIQUIDS, HAZARDOUS WASTE, PCHA AND INFECTIOUS WASTE MAY NOT BE ACCEPTED FOR DISPOSAL.	PERTAINS TO NEW SOLID WASTE DISPOSAL FACILITIES TO BE CHEATED ON SITE AND EXISTING LANGFILLS THAT WILL BE EXPANDED DURING REMEDIATION. PORTIONS ALSO MAY PERTAIN TO EXISTING AREAS OF CONTAMINATION THAT WILL BE CAPPED IN PLACE PER SOLID WASTE RULES.	ACTION
1D:614+	3745-27-19	D(2)	SANITARY LANDFILL OPERATIONS - CONSTRUCTION COMPLIANCE	REQUIRES THE OWNFRWDPERATOR TO MPLEMENT MEASURES TO ATTAIN COMPLIANCE WITH REQUIREMENTS OF THESE RULES IN THE EVENT THAT TESTING INDICATES THAT A COMPONENT ON PORTION OF THE LANDPILL HAVE NOT BEEN CONSTRUCTED IN ACCORDANCE WITH THOSE RULES.	PERTAINS TO "NEW" SOLID WASTE DISPOSAL FACILITIES TO BE CHEATED ON SITE AND EXISTING LANDFILLS THAT WILL BE EXPANDED DURING REMEDIATION ALSO PERTAINS TO CONSTRUCTION OF FINAL COVER SYSTEMS.	ACTION
	3746-27-19	F, a	SANITARY LANDFILL OPER, - DAILY AND INSERMIDIATE COVER	INCLUDES HEQUIREMENTS FOR DAILY COVER AND NITEHMEDIATE COVER FOR TEMPORARILY INACTIVE AREAS.	PERTAINS TO "NEW" BOLID WASTE DIBPOSAL FACILITIES TO BE EXPANDED DURING REMEDIATION	ACTION
	3745-27-19	н	SANITARY LANDFILL OPERATIONS - FINAL COVER	INCLUDES REQUIREMENTS FOR THE FINAL CAP SYSTEM FOR AREAS AT FINAL ELEVATIONS.	PERTAINS TO NEW SOLID WASTE DISPOSAL FACILITIES TO BE CREATED ON: SITE AND EXISTING LANDFILLS THAT WILL BE EXPANDED DURING HEMEDIATION, PORTIONS ALSO MAY PERTAIN TO EXISTING AREAS OF CONTAMINATION THAT WILL BE CAPPLO IN-PLACE FER SOLID WASTE RULES.	ACTION
O EPA DERR		ι	SANITARY LANDFILL OPERATIONS - PCBs AND HAZARDOUS WASTE	REQUIRES DWNERS/OPERATORS TO CONDUCT A PROGRAM TO DETECT PCD LYASTE AND HAZARDOUS WASTE PRIOR TO DISPOSAL UPON DETECTION OR SUSPECTED DETECTION OF SUCH WASTES, REQUIRES THOSE WASTES TO NOT BE PLACED AT THE WASKING FACE OF THE LANDFILL AND TO MANAGE THOSE WASTES IN ACCORDANCE WITH APPLICABLE LAWS AND REGULATIONS.	PERTAINS TO NEW BOLID WASTE DISPOSAL FACILITIES TO BE CREATED ON-SITE AND EXISTING LANDFILLS THAT WILL BE EXPANDED DURING REMEDIATION.	ACTION
FROM OHIC	3746-27-19	J	SANITARY LANDER L DEFRATIONS - SURFACE WATER MGMNT.	SURFACE WATER MUST BE DIVERTED FROM AREAS WHERE SOLID WASTE IS BEING, OR HAS BEEN, DEPOSITED, ALSO REQUIRES RUN ON AND RUN OFF TO BE CONTROLLED TO MINIMIZE IMPLITIBATION THROUGH THE COVER MATERIALS AND TO MINIMIZE ENGSION OF THE CAP SYSTEM.	PERTAINS TO NEW SOLID WASTE DISPOSAL FACILITIES TO BE CHEATED ON-SITE AIM EXISTING LANDFILLS THAT WILL BE EXPANDED IMMINIS REMEDIATIONS PORTIONS ALSO MAY PERTAIN FO EXISTING AIREAS OF CONTAMINATION THAT WILL BE CAPPED IN PLACE PER SOLID WASTE RULES.	АСТЮН
	•	K	SANITARY LAIMPRIL OPERATIONS - LEACHATE MANAGEMENT	REQUIRES REPAIR OF LEACHATE OUTBREAKS; COLLECTION AND TREATMENT OF LEACHATE ON THE SURFACE OF THE LANDFILL; AND ACTIONS TO MINIMIZE, CONTROL OR ELIMINATE CONDITIONS CAUSING LEACHATE OUTBREAKS.	PERTAINS TO NEW SOLID WASTE DISPOSAL FACILITIES TO BE CREATED ON SITE AND EXISTING LANDFILLS THAT WILL BE EXPANDED DURING REMEDIATION. PORTIONS ALSO MAY PERTAIN TO EXISTING AREAS OF CONTAMINATION THAT WILL BE CAPPED IN PLACE PER SOLID WASTE RULES.	ACTION

### OHO ADMINISTRATIVE CODE GREWER'S LAGOON

ADMINIS CODE SECTION	PERTINENT PARAGRAPH	TITLE OR SUBJECT OF REGULATION	DESCRIPTION OF REGULATION	APPLICATION OF REQUIATION	AMAR
3746 37 30		SAINTANY LANDIN LE PHOINMINNS AND CLOSING	SPECIFIES CENTARE OPERATIONAL AND LOCATION STANDARIS FOR LANDFRUS ACCEPTION WASTE AFISH ARRES, 1894, ALSO REQUIRES CLOSURE OF SXISTING LINES WIRCLEDO NOT MEET THUSE STANDARIS BY OCTOBER 5, 1886	PERTAINS TO NEW SOLID WASTE DISPOSAL FACHLISES TO DE CHARTER ON SITE AND PRISTING LANDFRES THAT WILL SE EXPAINED DURING REALEDIATION PORTIONS	AC, BIGIN
3745 77 20	A,0.C	PROHIBITIONS AND CLOSING	MIRES FOR NEW AND EXISTENC SITES, LOCATION RIRPS WILL RESPECT OF SLOOP PLANS, AIRPONTS, GLOR (MIC FAULE PLUS CHIER REACHATE REQUIREMENTS	PERTAND TO BUILD WASTE LANDFILLS OPERIOD AFTER GROUPS (IN EXISTING FACHITIES DECENTION WASTE AFTER GOODING.	LOCATION ACTION
3/46 27 22	C.D.I, J,K,1	CRITERIA FOR PRIFOR BOLID WAS TE TRANSI ER FACTRITIES	PERMAPS SETBACKS FROM FLOODPLANS, SURFACE WATERS, PARKLANDS, DOMICRES REQUIRES EXPEDITE ETHERISM IN WASTE HANDENDEST COMESTIMENTER OF TRANSPORTED FOR THE COMESTIME STORY OF THE COMESTIME STORY OF THE COMESTIME STORY OF T	MAY PERTAIN TO REMEDIATION ACTIVITIES WHICH BIVOLVE SINID WASTE TRADISTER	
3746 77 23	0.7	OPERATION OF EQUIT WARTE THANHERS.	DISCUSSES ACCERS CONTROL, TIME LIMITS FOR THANSIEN, UILEN CONROL, POBURGER WARTES, 12 ACEIATE COLLINGS, UW SMINISTORIED, EXILEIGENCY PLANNING	MAY PERIANI TO RIMITANIAN ELIONES WHILL HIVEN VE WASTE TRANSPORTATION	
3146 27 74	£ 15. <b>6</b>	FINAL CLOSIDAF DE ROLID WASTE THANSER FACILITIES	RECORRES CLEARUP AND WASTE ILLINOVAL FROM THANDFER FAI HELY AFELN BRUTTHOWIG HELDING & THE GRIBSIONNIG OF LEACHASE CONTROL SYSTEM	MAY PENSAM. TO TRANSISM FACILITIES 115ED III MARIEDIATION LIFUHEL.	
1146 27 81	C D t.J.K U,M N	ACOITIONAL CRITERIA FON SOLID WASTE INCINERATOR PTI	RUNES FOR LOCATION OF INCIMERATOR (BETWACK PROM WATER SUPPORE PLOCUPLANTS, PARKLANDS, DOMINILES) — LONGTHULLTION CONTRONES INCLOUNTED A GRAFIE CONTROL BY STEM	PERTAINS TO SULID WASTE INCINERATORS WHICH MAY BE CONSTRUCTED AS PART OF IMMEDIATION SPECIALS AT SUF-	
3146 27 67	A Z	OPERATION OF SOLNS SYACTE HIGHWHATCH FACHITMS	RINES FOR EAST OPERATION OF HICHERATOR INCLUDING ACLESS CONTROL, FINE CONTROL, RECURD RESPIRE, EMERGING MAIN ON SITE STORAGE, WASTES FORBIDDEN FROM HICHITATRIFF, GROUNDWATER MOUNTOING, FEACHAFL CONTROL, WASTE HANDLING	PENTAMS TO INCINERATIONS SYMBOLISMAY BE CONSTRUCTED AS PAIN OF OUR SITE REACTORATION REPORTS	
3746 27 63	c,o	FINAL CLOSURE, GOLID WASTE HECHIERATOH	REQUIRES INCINERATOR SITE TO SE DECONTAMBIATED UPON CLOSHRE AND LEACHAGE SYSTEM DECOMISSIONED TO PREVENT JUTUILE POLLUTION PROBLEMS:	APPLICABLE TO BITES WHICH MIGHERATED HAZARDOUS WASTES	
3748-31 03	A (2)	PERMIT TO WISTALL, EXLIMPTIONS	EXEMPTS SUPERSURD (CERCLA) SITES FROM AIR PUBLICATION REQUIREMENTS. SUCH SITES MUST STRUMET SUBSTAILING REQUIREMENTS OF PRIMIT AND AIR EMISSION STRUE.	APPLIES TO SUPERIUMD SITES WHERE ALL ACTIVITIES ARE CAMBLED OUT ON SITE	
3746 31-06		WATERVAIR PERMIT CRITERIA FOR OFCISION BY THE DIRLCTOR	A PERMIT TO HISTALL (IFTH OIL PLANS MUST DEMONSTRATE HESE AVAILABLE TECHNOLOGY (BAT) AND SHALL HOT HITERIFH WITH OR PREVENT THE ATTARIMENT ON MAINTENANCE OF APILICABLE AMULTI AN QUALITY STANDANDS	PERIODIS TO ANY BITE THAT WILL DISIABLE TO OH SITE SUMPACE WATCH OR WILL EMIT CONTAMINANTS HITO THE AIR	ACHUH
3746 32 04		WATER QUALITY CRITERIA FOR DECISION BY THE DIRECT OR	EPECFIES SUBSTAIRTWE CRITERIA FOR SECTION 401 WATER QUARTEY CRITERIA FOR DREDOMO, PREIMO, ODSTRUCTIONO ON ALTERNIQ WATERS OF THE STATE.	PENTANIS TO ANY SITE THAT HAS OR WILL AFFECT WATERS OF THE STATE.	ACTION
3745-34 08		PROHIBITION OF UNAUTHORIZED INJECTION	UNDERGROUND INJECTION IS PROBBITED WITHOUT AUT. IORIZATION FROM THE DIRECTOR.	PERTAINS TO SITES AT WHICH MATERIALS ARE TO BE INJECTED LIMID HUMBROHIMD. CONSIDER FOR TECHNOLOGIES SUCH AS BIOHEMEDIATION AND BOIL FLUSHING.	ACTION

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AGE	ADMINIS. CODE SECTION	PERTINENT PARAGRAPH	TITLE OR SUBJECT OF REGULATION	DESCRIPTION OF REGULATION	APPLICATION OF REGULATION	ARAR TYPE
a.	3746-34-07		NO MOVEMENT OF HUID INTO UNDERGROUND OMNKING WATER	THE UNDERGROUND INJECTION OF FLUID CONTAINING ANY CONTAININANT INTO AN UNDERGROUND BOURCE OF DRINKING WATER IS PROHIBITED IF THE PRESENCE OF THAT CONTAININANT MAY CAUSE A VIOLATION OF THE PRIMARY DRUKING WATER STANDARDS OR OTHER WISE ADVERSELY AFFECT THE HEALTH OF PERSONS.	PERTAINS TO SITES AT WHICH MATERIALS ARE TO BE INJECTED UNDERGROUND. CONSIDER FOR TECHNOLOGIES SUCH AS BIOREAMEDIATION AND SOIL FLUSHING.	
9	3746-34-08		ELIMINATION OF CLASS IV WELLS	THE MIJECTION OF HAZARDOUS OR RADIOACTIVE WASTE DIRECTLY INTO AN UNDERGROUND SOUNCE OF DRINKING WATER IS PROHIBITED.	PERTAINS TO SITES AT WHICH PARTERIALS ARE TO BE INJECTED UNDERGROUND. CONSIDER FOR TECHNOLOGIES SUCH AS UICHEMEDIATION AND SOIL FLUSHING.	
644+31	3746-34-10		WAVER OF REQUIREMENT BY DIRECTOR	THE DIRECTOR MAY AUTHORIZE LESS STRINGENT REQUIREMENTS FOR AN INJECTION THAT DOES NOT OCCUR INTO, THROUGH OR ABOVE AN UNDERGROUND SOURCE OF DRINKING WATER.	PERTAINS TO SITES AT WHICH MATERIALS ARE TO BE INJECTED UNDERGROUND. CONSIDER FOR TECHNOLOGIES SUCH AS BIOREMEDIATION AND SOIL FLUSHING.	
614+	3746-34-13		CLASS V WFELS	SPECIFIES REQUIREMENTS FOR CLASS V WELLS. SEL 3745-34-01+CMI DEFINITIONS.	PERTAINS TO BITES AT WINCH MATERIALS ARE TO BE INJECTED UNDERUNDUND. CONSIDER FOR TECHNOLOGIES LIBER AS BIOXEMEDIATION AND SOIL FLUSHING.	
Ω.	3745-34-26		CONDITIONS APPLICABLE TO ALL PERMICS	BPECIFIES MINIMUM CONDITIONS TO BE APPLIED TO ALL UNDERGROUND INJECTIONS.	PERTAINS TO BITES AT WHICH MATERIALS ARE TO BE MIJECTED UNDERGINOUND. CONSIDER FOR TECHNOLOGIES SUCH AS BIOHEMEDIATION AND SOIL FLUGHING.	
	3746-34-34		MECHANICAL INTEGRITY	SPECIFIES REQUIREMENTS TO BE MET TO ENSURE MECHANICAL INTEGRIFY OF WELLS.	PERTAINS TO SITES AT WHICH MATERIALS ARE TO BE INJECTED UNDERDROUND. CONSIDER FOR TECHNOLOGIES SUCH AS BIURLMEDIATION AND SOR FLUISHING.	
	3748-34-36		PLUGGING AND ABANDONING CLASS I WELLS	SPECIFIES REQUIREMENTS TO BE MET WHEN PLINGING OR ABANDONING A CLASS I WELL. SEE 3/45 34-04 FOR DEFINITIONS.	PERTAINS TO SITES AT WHICH MATEMALS ARE TO BE INJECTED UNDERGROUND. CONSIDER FOR TECHNOLOGIES SUCH AS BIOREMEDIATION AND SOIL FLUSHING.	·
A DERR	3746 34-37		CONSTRUCTION REQUIREMENTS FOR	SPECIFIES CONSTRUCTION AND SITING REQUIREMENTS FOR CLASS $\boldsymbol{t}$ WELLS.	PERTAINS TO SITES AT WHICH MATERIALS ARE TO BE INJECTED WIDERGROUND. CONSIDER FOR TECHNOLOGIES SUCH AS DIGREMEDIATION AND SOIL FLUSHING.	ACTION LOCATION
IO EP			OPERATING, MONITORNIG & REPORTING HEO FOR CLASS I WE'LS	SPECIFIES OPERATING, MONITORING AND REPORTING REQUIREMENTS NECESSARY FOR CLASS I WELLS.	PERTAINS TO SIVES AY WHICH MATERIALS ARE TO BE INJECTED UNDERGROUND. CONSIDER FOR TECHNOLOGIES SUCH AS BIOREMEDIATION AND SOIL FLUSHING.	
HO: 2004	3746-60-221	A,B	PETITIONS TO EXCLUDE A LISTED WASTE AT A FACILITY	ALLOWS FOR PETITIONS TO EXCLUDE HAZARDOUS WASTES FROM A PARTICULAR FACILITY FROM THE LISTS IN RULES 3746-81 30 TO 3745-51-31 OF THE DAC. ALSO STATES THAT ONIO EPA WILL RECOGNIZE USEPA'S DECI: ION TO GRANT OR DENY SUCH PETITIONS ON THE FEDERAL LEVEL.	PERTAINS TO ANY SITE WHICH HAS WASTES THAT WILL BE DELISTED BY USEPA. SHOULD OHIO LIST WASTES NOT AUDICUSED BY USEPA, THIS HULE WOULD ALLOW OHIO EPA THE OPPORTUNITY TO DELIST THESE WASTES.	ACTION
0 0 0 0	3745-69 44 0		PERAIT INFO NEQUERY FOR ALL HAZ WASTE FACILITIES	EBTAMISHES THE SUBSTANTIVE HATARDOUS Y/ASTE PLHMIT HEQUIREMENTS NECESSARY FOR ONIO EPA TO DETLIMINE FACILITY COMPLIANCE: INCLUDES INFORMATION SUCH AS FACRITY DESCRIPTION, WASTE CHARACTERISTICS, EQUIPMENT DESCRIPTIONS, CONTINGENCY PLAN, FACILITY LOCATION, TOPOGRAPHIC MAP, ETC.	PERTAINS TO ARY SITE WHICH WILL HAVE TREATMENT, STORAGE ON DISPOSAL OF HATARODUS WASTE OCCURRING ON SITE OR HAS EXISTING AREAS OF HAZARDOUS WASTE CONTAMINATION ON SITE THAT WILL BE CAPPED IN PLACE. THIS, ALONG WITH OTHER PARAGRAPHS OF THIS RULE, ESTABLISHES THE MINIMUM WIFORMATION REQUIRED DURING THE REMEDIAL DESIGN STAGE	ACTIGH

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ACE	ADMINIS CODE SECTION	PERTINENT PARAGRAPH	TITLE ON BUBJECT OF REGULATION	DEBCRIPTION OF REQUESTION	APPLICATION OF REGULATION	ANAR TYPE
α.	)/46 8U 44		PERAINI MIFO REQ FOR ALL ISAZ WASTE LAMO DISP FACHITIES	BEFARLISING THE SUMSTANTIVE HAZAMHOUS WASTS LAND MISPOSAL PLANT REQUIREMENTS NECESSARY FOR CHOOCIFA TO DETERMINE ADEQUATE PROFECTION OF THE GIRDUND WATER INCLUDES IN ORMATION SUCH AS GROUND WATER MONIFORMU DATA, HIFOMMATION ON INTERCONNECTED AUDITING, PLUMEISFOF CURE ARMISTON, PLANS AND REPORTS ON GROUND WATER MONITORING PROGRAM, ETC.	PERSANS TO ANY FACRITYISHS WISCH WILL HAVE HAZARDOUS WASTE DISPOSED OF ON SITE OR HAS EXISTING AMAGE OF HAZARDOUS WASTE CONSAMMIATION ON SITE THAT WILL SE CAPPED IN PLACE. THIS, ALONG WITH OTHER PARAGRAPHS OF THIS RULE, ESTAMISHES THE MINIMUM INFORMATION REQUIRED DUMBIN THE ISLEMEDIAL DESIGN STACE.	ACTION
4-644-3145	3746 (0 44	<b>C</b> I	APP'S PERMIT MITO: MAZ WASTE STURAGE IN CONTAMERS	ESTABLISHES THE SINSTANTIVE HAZARDOUS WASTE PERMIT REJUMENSHIS HECESSARY FOR OND SPA TO HE ISMME ADEQUACY OF CONTAINER STONAGE. MECLURES WEORMATION SUCH AS DESCRIPTION OF CONTAINMENT SYSTEM, HE FAILED BRANVINGS. FYC SEE DAG 3748 SE 70 THINDUMH 3745 SE 78 FOR AMBIEMAN. CHISTAIN RESIDER MEMBE.	PERTAINE TO ANY SITE AT WINCH STORAGE OF HAZARDOUS WASTE ON SITE WILL OCCUR IN CONTAINERS. COIN-DER FOR WASTES AND CONTAMINATED SORS THAT ARE STORED PRIOR TO THE ANALYSISTS ON DISPUSAL. THIS, ALONG WITH CHIER PARAGRAPHS OF THIS RULE AND DAC 3746 S6 JU THROUGH 3746 S6 JU THAD INFORMATION AND THE COMMENTAL THE ANALYSISTS AND THE ANALYSISTS OF THIS AUGUST STAGE.	АСЭКН
 0:	374 <b>1 10</b> 44	c;	AID'S PERIME IMPO HAZ WASTE BTORACIE? PHEAT HET ANKS	ESTABLISHES SUBSTAINTIVE HAZARDOUS WASTE PERMIT RECOMMENTS IN CESSAMY FOR CHIEF SPA TO DETERMINE AREQUACY OF TARK THEATMERS AND STURAUS WHIS HIS LUCES INFURSATION OF TARK SESSECTIONS OF STRUCTURAL INSERTINTY, IN FAIR SUBSTAINS OF TARK SESTIMISE. OF SUBSTAINS OF SUCCESSARY CONTABINATION EYSTERS SEC. SES DAY JASSE SO THROUGH JASSES SESUR ADDITIONAL RECHROAGENES.	PERTAME TO ANY SITE AT WHICH BEGRAGE OR TRPATMENT OF HAZAIIGHTS WAS IS HET SANKS WILL DUCUH OH SITE. THE, ALOND WITH OTHER PARAGRAPHS OF 1815 MULT AND DAG.  2746 BB BU STRICURIE 2746 BB 89, ESTAMISHED SITE MINIMENA.  WE TRIAGSTON: LOWRED DIMING THE REMEDIAL DESIGN STAGE	АСТЮН
EPR		C4	ADD'L PERMIT INFO HAZ WASTE STOH/TREAT IN WASTE PILES	RETABLISHE'S SUBSTANTIVE HAZARDOUS WASTE PERMIT PROGRESHES PLOCESSARY FOR ONIO EPA TO DE FRANCE ADEQUACY OF SUBSACE IMPOUNDMENTS USED TO THEAT OR STORE, HAZARDOUS WASTE. INCLUDES HE ORMATION SUCH AS WASTE CHARACTERISTICS, DETAILED DESIGN PLANS AND REPORTS, CONTROL DE RUIE ON AND RUIE OFF, CLOSURE MEDIMATION, SEC. SEE DAG 3/46 58 30 THICOUGH 3748 58 37 FOR ADDITIONAL SUBFACE MAPOUNDMENT REQUIREMENTS	PERTAINS TO SIEE AT WHICH HAZARDOUS WASTE WEL SE STORILD ON THEATED IN SURFACE INFOUNDMENTS. THIS ALONG WITH OTHER PARAGRAPHS OF THIS HULF AND DAC 3746 BS 70 THIMBURD 3746 BS 33, ESTABLISTICS ELECTROMIM MEGHINATION REQUIRED DIMING THE HEMEDIAL DESIGN STAGE	ACTION
OM: OHIO EPA D	374 <b>8 80</b> 44	C6	ADD'S PERMIT INFO, HAZ WASTE THEATIDISP BY LAJID INFAT	ESTABLISMES SUBSTANTIVE HAZARDQUS WASTE PRIMIT REQUIREMENTS NECESSARY FOR ONO EPA TO DESTANDIE ADEQUACY OF LAND TRATMINET TO TREAT OR DISPOSE OF HAZARDOUS WASTES MICLUDES WEORMATION SUCH AS WASTE CHARACTSHIFTICS, DESIGN MASSINES TO MAXIMIZE TRATMINE, DIRECTIONS OF TREATMENT ZONE, DESIGN OF USET, INFORMATION ON POTENTIAL CHOPS, ETC. SEY OAC 2749-85-70 THEODIGHS 3746-86-82 FOR ADDITIONAL LAMO TREATMENT HEOUREMENTS.	PERTAINS TO ANY SITE AT WHICH LAND TREATMENT WILL SE USED TO THEAT ON DISPOSE OF HAZARDOUS WASTES THIS, ALLIND WITH OTHER PARAGUAPHS OF THIS RULE AND OAC 3745-20 SO THROUGH 3745-33 SO, ESTAGLISHES THE MUNAUM INFORMATION REQUIRED DURING THIS REMEDIAL DESIGN STAGE	ACTION
97 84 84 98	3748 80 44	CQ .	ALID'L PEHANT INFO. ENVIRONMENTAL PERLOHMANCE STANDARDS	ESTABLISHES SUBSTANTIVE HAZARDOUS WASTE PERMIT REQUIREMENTS HECESARY POR CHILD FPA TO DETERMINE ADEQUACY OF SUMPACE IMMUNICATIONS, WASTE PIESS, LAND TREATMENT UNITS, LANDFILLS, AND UNDEROROUND INJECTION WELLS USED TO TREAT, STORE OR DISPOSE OF HAZARDOUS WASTE. INCLUDES INFORMATION SUCH AS WASTE CHARACTERISTICS, DETAILED DESIGN PLANS AND REPORTS, CONTROL OF RUN ON AND HUN OFF, CLUSTINE INFURNATION, STC. SEE OAC 3748-87-01. ADDITIONAL REQUIREMENTS.	PERFARIS TO SITE AT WHICH HAZARDORIS WASTE WILL BE OR HAG BEEN STURED. THEATED OR DISPOSED UP IN USAN ACE MAINDUNIUMENTS, WASTE PILES, LAND ENLATMENT UNITS, LANDPILLS OR UNDERGROUND INJECTION WELLS. THIS, ALONG WITH OTHER PARAGRAPHS OF THIS RULE AND GAC 3748-67 OF ESTABLISHES THE MINIMUM INFORMATION REQUIRED DURING THE REMEDIAL DESIGN STAGE.	ACTIGI

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**ADMINIS** PERTINENT TITLE OR SUBJECT DESCRIPTION APPLICATION ARAR CODE PARAGRAPH OF REGULATION OF REGULATION TYPE OF REGULATION Ģ SECTION 3145-50 44 C7 ADD'L PERMIT INFO; HAZ WAGTE ESTABLISHES SUBSTANTIVE HAZANDONS WASTE FERMIT PERTAINS TO SITE AT WHICH HAZARDOUS WASTE WILL BE OR ACTION DISPOSAL HI LANDFILLS REQUIREMENTS NECESSARY FOR QUIO EPA TO DETERMINE ADEQUACY HAS BEEN DISPOSED OF M LANDFILLS. TIES, ALONG WITH OTHER PARAGRAPHS OF THIS RULE AND DAC 3745-67-02 OF LANDFILLS USED FOR DISPOSAL OF HAZARDOUS WASTE. THROUGH 3746-57-18, ESTABLISHES THE MINIMUM INFORMATION INCLUDES INFORMATION BUCH AS WASTE CHARACTERISTICS, D. TAILED DESIGN PLANS AND REPORTS, CONTROL OF RUN-ON AND RUN-OFF. REQUIRED DURING THE REMEDIAL DESIGN STAGE. CLOSURE INFORMATION, ETC.. SEE DAG 3745 67-02 THROUGH 3745 67-18 FOR ADDITIONAL LANDFILL REQUIREMENTS. 4 PERTAINS TO SITE AT WHICH HAZARDOUS WASTE WILL BE ACTION ADD'L PERMIT INFO; HAZ WASTE ESTABLISHES SUBSTANTIVE HAZARDOUS WASTE PERMIT 3745-60-44 CB THEATED BY HICHERATION. THIS, ALONG WITH OTHER REQUIREMENTS NECESSARY FOR ONO EPA TO DETERMINE ADEQUACY TREATMENT BY INCINERATION ÷ PARAGRAPHS OF THIS RULE AND DAC 3746-57-40 THROUGH OF INCINERATORS USED TO TREAT HAZARDOUS WASTE, WICLIDES 4 3746-67-61, ESTABLISHEG THE MINIMUM INFORMATION REQUIRED INFORMATION SIGH AS WASTE CHARACTERISTICS, DETAILED DI SIGN 10 DIMINO THE REMEDIAL DESIGN STAGE. PLANS AND REPORTS, TRIAL BURN DATA, CLOSURE INFORMATION. ETC ... SEE OAC 3746-57-40 THROUGH \$746-57-61 FOR ADDITIONAL INCINERATOR HEQUIREMENTS. w Ω PERTAINS TO FACILITY/SITE AT WHICH HAZARDOUS WASTE WILL ACTION ESTABLISHES SUBSTANTIVE HAZARDOUS WASTE PERMIT ADD'L PERMIT INFO: HAZ WASTE T/B/D 3745-60-44 C9 BE STORED, TREATED OR DISPOSED OF IN MISCELLAHEOUS REQUIREMENTS NECESSARY FOR OHIO EPA TO DETERMINE ADEQUACY IN MISC UNITS UNITS. THIS, ALONG WITH OTHER PARAGRAPHS OF THIS BURE OF MISCELLANEOUS UNITS USED TO TREAT OR STORE HAZARDOUS AND UAC 3746-87-90 THROUGH 3745-67-93, ESTABLISHES THE WASTE. INCLUDES INFORMATION SUCH AS WASTE CHARACTERISTICS. MINIMUM INFORMATION REQUIRED DURING THE REMEDIAL DETAILED DESIGN PLANS AND REPORTS, CONTROL OF MUN ON AND MUN OFF, CLOSURE INFORMATION, LTC.. SEE OAC 3745-67-90 DESIBN BTAGE. THROUGH 3745 67-93 FOR ADDITIONAL REQUIREMENTS FOR MISCELLANEOUS UNITS. PERTAINS TO ALL ALTERNATIVES THAT WILL HICORPORATE ACTION ESTABLISHES GENERAL PERMIT CONDITIONS APPLIED TO ALL HAZARDOUS WASTE FACILITY PERMIT 3745-60 58 E,1,J TREATMENT, SYDRAGE OR DISPOSAL OF HAZARDOUS WASTE. HAZARDOUB WASTE FACILITIES IN OINO. INCLUDES CONDITIONS SUCH CONDITIONS AS OPERATION AND MAINTENANCE, SITE ACCESS, MOHITORING, ETC. DERI ACTION CONSIDER FOR SITES WHERE THE QUANTITY OF HAZARDOUS SPECIFIES REQUIREMENTS FOR CONDITIONALLY EXEMPT SMALL REQ. FOR CONDITIONALLY EXEMPT WASTE GENERATED BY AN ON-SITE ACTION WILL BE LESS THAN CHEMICAL 3745-51-05 A.J QUANTITY DEHERATORS OF HAZARDOUS WASTE. PROVIDES RELIEF. SMALL QUARTITY GENERATORS 100 KG PER MONTH. MONTHLY LIMIT FOR ACUTE HAZARDOUS ΕP FROM MANY OF THE HAZARDOUS WASTE REGULATIONS. WASTE IS ONE III KO. 0 ACTION PEHTAINS TO ANY ALTERNATIVE THAT INCORPORATES STORAGE EXEMPTS THE RESIDUES OF HAZARDOUS WASTES FHOM EMPTY RESIDUES OF HAZ WASTES IN EMPTY OF HAZARDOUS WASTE ON-SITE IN CONTAINERS. 3745-51-07 A.B CONTAINERS FROM THE HAZARDOUS WASTE REGULATIONS. PROVIDES O CONTAINERS SPECIFIC DEFUITIONS FOR THESE RESIDUES. Σ CHEMICAL PERTAINS TO SITES AT VAIICH WASTES OF ANY TYPE (BOTH ANY PERSON GENERATING A WASTE MUST DETERMINE IF THAT WASTE EVALUATION OF WASTES ACTION 3748-62-11 SOLID AND HAZARDOUSI ARE LOCATED. A-D IS A HAZARDOUS WASTE IEITHER THROUGH LISTING OR BY 0 CHARACTERISTIC). W CHEMICAL PENTAINS TO SITES WHERE HAZARDOUS WASTE WILL BE REQUIRES A GENERATOR WIND TRAILSPORTS OR OFFERS FOR m HAZARDOUS WASTE MANIFEST -THANSPORTED OFF-SITE FOR TREATMENT, STORAGE OR ACTION 3745-62-20 TRANSPORTATION HAZARDOUS WASTE FOR OFF-SITE TREATMENT, GENERAL REQUIREMENTS STORAGE OR DISPOSAL TO PREPARE A UNIFORM HAZARDOUS WASTE DISPOSAL œ MANHERT O

### OHIO ADMINISTRATIVE CODE II ARARI GREWER'S LAGOON

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ACE	ADMINIS CODE SECTION	PERTINENT PARAGRAPH	TITLE OR SUBJECT OF REQUIATION	DESCRIPTION OF HEGULATION	APPLICATION OF REGULATION	ARAR TYPE
Φ,	J/46 \$2 22		HAZARDOUS WASTE MANULET INMSER OF COPIE	SPECIFIES THE MIRABELL OF STATISTISSES COPIES TO BE PREPARED.	PERFARIS TO SITES WHERE HAZARDOUS WASTE WILL SE TRANSPORTED LIFF SITE FOR TREATMENT, STORAGE OR DISPOSAL	CHEFAICAL ACTION
	3746 62 23		Pais Tasmians Staaw Sudurasans	SPECIFIES PROCEDURES FOR THE USE OF HAZAMDOUS WASE: MAINTEETS BICLUMMO A REQUIREMENT STAT TIREY BE HAND SIGNED by the Generation	ERTAINS TO SITES WHERE HAZARDOUS WASTE WILL BE TRAINSPORTED OFF-BITS FOR TREATMENT, STUMAGE OR DISPORAL	CHEMICAL ACTION
18.	3746 62-30		HAZARDOUS WASTE PAUKAGING	REQUIRES A GENERATOR TO PACKAGE HAPAROUSE WASTE IN ACCUMDANCE WITH U.S. DOT REQUESTIONS FOR THANSPORTATION OF SITE	PERTARIS TO ABLY SITE WHERE HAZARDOUS WASTE WILL BE GENERATED BY ON SITS ACTIVITIES AND SHIPPED OFF SITS FOR TREAMLESS ANDIOR DISPOSAL.	CHEMICAL ACTION
14-644	3746 62 31		DHISTA (STAAW SIMMASAI)	REQUIRES PACKAGES OF HAZARDOUS WASTE TO BE LABELLED ME ACCORDANCE WITH HE FOOT RETHINATIONS FOR DIFE SHE THANSPORTATION	PEREARNS TO ANY SITE WHIRE HAZARDOUS WASTS VILL BE GENERALED BY ON SITE ACTIVITIES AND SHIPTED HIT SITS FOR THEATMENT ANNUM HEROSAL	CHEMICAL ACTION
Ω Ω	1746 67 28		HAZARIQUE WASTE HANKIHO	SPECIFIES LANGUAGE FOR MANKING PACEAGES OF HAZARIMIES WASTLEMENT TO OFF SITE TRANSPORTABILIES	PERT-URL TO ALLY GITE WHERE HAZARDOUS WASTE WAS BE GITH HATED BY ON BITE ACTIVITIES AND SHIPPEN OFF SITE FIR THEATMART AND/OR INSPOSAS.	AC FIGH
	3746 67 33		HAZAROOLIŞ YAZAFE PLACAHDING	GENERATOR SHALL PLACARD HAZARDDUS WAGTE PRIMETO DEF SITE TRANSPORTATION:	PERTAINS TO ANY SITE WHERE HAZARDOUS WASTE WILL SE (MIMITATED BY ONE SITE ACTIVITIES AND SHIPPED LIFE SITE FOR THE ATMENT ANNIHIN DISPOSAL	CHEMICAL ALTUM
	3748 42 34		ACCUMULATION THAT OF HAZARDOUS WASSE	IDENTIFIE MAXIMUM TIME PERIODS THAT A GLUERATOR MAY ACCUMULATE A HAZARIBUUS VIASTE WITHOUT BEHILD CHISIDERED AN DPERATOR OF A STRIKUS FACHILY. ALSO CSTABLISHED STANDARISE FOR MANAGEMENT OF HAZARIBUS WASTES DY GENERATORS.	FERTAINS TO A SIZE WHERE HAZARDOUS WASTE WILL SE DENFRATED AS A MESULT OF THE HEARTMAL ACTIVITYS	CHEMICAL ACHON
DERR	1745 64 13	<b>A</b>	GENERAL AMALYBIC OF HAZARUDUS LYASTE	PRIOR TO ARY TREATMENT, BYUNAGE OR DILLFOGAL OF HAZARDOUS WASTES, A REPRESENTATIVE BANFLE DF THE WASTE MUST BE CHEMICALLY AND PHYSICALLY ANAYZED.	LESTABLE TO ALLY SITE AT WHICH HAZARDOUS IS TO BE THE ALED, STORED ON DISPOSED OF FOR HAS WEED DISPOSED OF	CHEMICAL
O EPA	3745 54 14	A,8,C	SECURITY FOR HAZARDINIS WASTE PAINTIPS	ISAZARGOUS WASTE FACRITIES MUST BE SECURED SO THAT UNAUTHORIZED AND UNKNOWING ENTRY AND ENIMINATED DIS PROPRIETED.	PERTANS TO ANY SITE AT WHICH HAZARDOUS IS TO BE THEATED, STORED ON IOR HAS BEEN DISPOSED OF).	AC JION
POM OH!		A,C	INSPECTION ASSISTANCEITS FOR MAZAIDOMS WASTE LACILITIES	HAZARDONS WASTE FACILITIES MUST SE INSPECTED REQULARLY TO DETECT MALFUNCTIONS, DETENDIATIONS, OPERATIONAL EMPINE AND DISCHARGES. ANY MALFUNCTIONS ON DETENDIATIONS DETECTED SMALE SE REMEDIED EXPEDITIOUSLY.	PERTAINS TO ARY SITE AT WHICH HAZARDOUS IS TO 84 THEATED, STUILLY ON DISPUSED OF (OR HAD DEEN DISPUSED OF)	ACEUNI
. 50 F		A,B,C	REG FOR IGNITABLE REACTIVE OR INCOMPATABLE INACTIVABLE	PRESENTS GENERAL PRECAUTIONS TO BE TAKEN TO PREVIABLE ACCIDENTAL KINISION ON REACTION OF IGNITIABLE, BLACTOF OR INCOMPATIBLE VASSES.	PERTABLE TO ANY SITE AT WHICH POTENTIALLY REACTIVE. RIGHSADIE OR RICHAPATRIE WASTES ARE PRESENT.	ACTION LOCATION
-98 13	3745-84-18	A,8,C	LOCATION STANDARDS FOR HAZARDAIS WASTE TISID FACHTIES	RESTRICTS THE SITING OF HAZARINDUS WASTE FACILITIES IN ANEAS OF STIBILIC ACTIVITY ON FLOUDPLAINS.	FERTANIS TO ANY SITE AT WHICH HAZARDOUS IS 10 BE THE ATEU, STONED OR HISPOSED OF FOR HAS BEEN DISPOSED OF	LOCATION

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AGE	ADMINIS. CODE SECTION	PERTINENT PARAGRAPH	TITLE OR SUBJECT (IF REGULATION	DESCRIPTION OF REGULATION	APPLICATION OF REGULATION	ARAR TYPE
α, '	3746-54-51		DESIGN & OPERATION OF HAZARDOUR WASTE FACILITIES	NAZARIOUS WASTE FACILITIES MUST BE DESIGNED, CONSTRUCTED, MAINTAINED AND OPERATED TO MINIMIZE THE POSSIBILITY OF FIRE, EXPLOSION OR UNITAINED RELEASE OF HAZARDOUS WASTE OR HAZARDOUS CONSTITUENTS TO THE AIR, SOIL OR SURFACE WATER WHICH COULD THREATEN HUMAN HEALTH OR THE ENVIRONMENT.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS IS TO BE THEATED, STORED OR DISPOSED OF (OR HAS BEEN DISPOSED OF).	ACTION
φ	2746-54-32	A,8,C,D	REQUIRED EQUIPMENT FOR HAZARDOUS WASTE FACILITIES	ALL HAZARDOUS WASTE PACILITIES RUIST BE EQUIPPED WITH EMERGENCY EQUIPMENT, SUCH AS AN ALAIM SYSTEM, FINE CONTROL EQUIPMENT AND A TELEPHONE OIL RACIO.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS IS TO BE TREATED, STORED OR DISPOSED OF IOR HAS BEEN DISPOSED OFF.	ACTION
544+31	3745-64-33		TESTING & MAINTENANCE OF EQUIPMENT; HAZ WASTE FACILTIES	ALL HAZARDOUS WASTE FACILITIES MUST TEST AND MAINTAIN EMERGENCY EQUIPMENT TO ASSUITE PROPER OPERATION.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE IS TO BE TREATED, STORED OH DISPOSED OF IOR HAS BEEN DISPOSED OF).	ACTION
. 614+	3745-64-34		ACCESS TO COMMUNICATIONS OR ALARM SYSTEM; HAZ WASTE FAC	WHENEVER HAZARDOUS WASTE IS BEING HANDLED, ALL PERSONNEL INVOLVED SHALL MAVE IMMEDIATE ACCLES TO AN INTERNAL ALARM ON EMERGENCY COMMUNICATION DEVICE.	PERTAINS TO ANY BITE AT WHICH HAZARDOUS WASTE IS TO BE TREATED, STORED OR DISPOSED OF IOR HAS BEEN DISPOSED OF).	ACTION
0.1	3746 64-36		REQUIRED AISLE SPACE AT HAZ YJASTE FACILITIES	ADEQUATE AISLE SPACE SHALL HE MANITANIED TO ALLOW UNODSTRUCTED MOVEMENT OF PERSONNEL, FIRE EQUIPMENT, SPILL CONTROL EQUIPMENT AND DECONTAMINATION EQUIPMENT HITO ANY AREA OF THE FACILITY OPERATION IN THE EVENT OF AN EMERGENCY.	PERTAINS TO ANY BITE AT WHICH HAZARDOUS WASTE IS TO BE TREATED, STONED ON DISPOSED OF ION HAS BEEN DISPOSED OF!. CONSIDER FOR SITES WHERE WASTES WILL BE GIGHED BY CONTAINERS.	VCAIOH
	3745-54-37	<b>A</b> , <b>B</b>	ARRANGEMENTS/ AGREEMENTS WITH LOCAL AUTHORITIES	ARRANGEMENTS OR AGREEMENTS WITH LOCAL AUTHORITIES, SUCH AS POLICE, PINE DEPARTMENT AND EMERGINCY RESPONSE TEAMS MUST BE MADE. IF LOCAL AUTHORITIES WILL NOT COOPERATE, DOCUMENTATION OF THAT NON COOPERATION SHOULD BE PROVIDED.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE IS TO BE THE? TEO, STORED OR DISPOSED OF JOR HAS BEEN (MSPOSED OF).	ACTION
A DERR	3746-64-62	<b>A·F</b>	Content of Contingency Plan; Haz Waste Facilities	MAZARDOUS WASTE FACILITIES MUST HAVE A CONTINGENCY PLAN THAT ADDRESSES ANY UNPLANNED RELEASE OF HAZARDOUS WASTES OR HAZARDOUS CONSTIUENTS UTO THE AIR, SOIL ON SINFACE WATER. THIS RULE ESTABLISHES THE MINIMUM REQUIRED INFORMATION OF SUCH A PLAN.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE IS TO BE TREATED, STORED OR DISPOSED OF (OH MAS BEEN DISPOSED OF).	ACTION
OHIO EP	3745 64-63	A,B	Comes of Contingency Plan; Hazardous Waste Facilities	COPES OF THE CONTINGENCY PLAN REQUIRED BY 3745-54-50 MUST BE MAINTAINED AT THE FACILITY AND SUBMITTED TO ALL LOCAL POLICE DEPARTMENTS, FORE DEPARTMENTS, HOSPITALS LOCAL EMERGENCY RESPONSE TEAMS AND THE ONIO EPA.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE IS TO BE TREATED, STORED OR DISPOSED OF IOR HAS BEEN DISPOSED OF	ACTION
FROM: 0	3748 \$4-64	A	AMENIMENT OF CONTINGENCY PLAN; HAZ WASTE FACHITIES	THE CONTINGENCY PLAN MUST BE AMENDED IF IT FAILS IN AN EMERGENCY, THE FACILITY CHANGES (IN ITS DESIGN, CONSTRUCTION, MAINTENANCE OR OPERATION), THE LIST OF EMERGENCY COORDWATORS CHANGE OR THE LIST OF EMERGENCY EQUIPMENT.	PERTAING TO ANY SITE AT WHICH HAZAIDOUS WASTE IS TO BE TREATED, STORED OR DISPOSED OF IOR HAS BEEN DISPOSED UP:	ACTION
13:51			EMERGENCY COORDINATOR: HAZARDOUS WASTE FACILITIES	AT ALL TIMES THERE SHOULD BE AT LEAST ONE EMPLOYEE EITHER ON THE PREMISSS OR ON CALL TO COORDINATE ALL EMEMBENCY REPRONSE MEASURES.	PERTAINS TO ANY BITE AT WHICH HAZARDOUS WAGTE IS TO BE TREATED, STORED OR DISPOSED OF IOR HAS BEEN DISPOSED OF	ACTION
96-46		A-I	EMERGENCY PROCEDURES; (M2 ARCOUNTY FACILITIES	S SPECIFIES THE PROCEDURES TO BE FOLLOWED IN THE EVENT OF AN EMENGENCY.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE IS TO BE THEATED, STORED OR DISPOSED OF IOR HAS BEEN DISPOSED OF	ACTION 1.

### OHIO ADMINISTRATIVE CODE (* ARARI GREINER'S LAGOON

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PACE	SECTION	PERTINENT PARAGRAPH	TITLE OR EUBJECT OF REGULATION	DESCRIPTION OF REQUESTION	APPLICATION OF HEGULATION	ARAR TYPE
	1745 64 90		Ground water projection, applicability	ELTABLISHES CINCINSTANCES UNDER WHICH AN DPERATOR OF A HAZAINOOUS WASTE FACULIY RUST IMPSEMBIT A GROUND WATER FROTECTEDH PRUMIASI HR A CHMRECTIVE ACTION FROGRAM	PERTAINS TO ALL SITES WITH LAND BASED HAZARDOUS WASTE UNITS (SURFACE IMPOINDMENTS, WASTE PILES, LAND THEATMENT UNITS, LAINPILES). THIS INCLUDES EXISTING LAND BASED AREAS OF CUNEAMINATION	LOCATION ACTION
+3146	3746 64 01	<b>A</b>	HEO OROUND WATER PROGRAMS FOR HAZ WAKIE FACHINES	PRESENTS THE GROWN WATER MONITORING AND RESPONSE THE GREAT GRAVE SUICHIALAN NOT USENUARE AMARCHINE PHOCHMAN REQUIRED FOR HAZANGULE WAS 18 LARD WASED IN ITS	PERTANS TO ALL SITES WITH LAND BASED HAZARDOUS WASTE LINES E ISUAPACE IMPOLINOMENTS, WASTE PRES. LAND TREATMENT LINES, LANDFILES). THIS INCLUDES EXISTING FAND PASED AREAS OF CONTABINATION	ACTION
6:4+644	3745 64 92		GROUND WATER PROTECTION STANDARD, HAZ WASTI FACRITIES	COMPLIANCE MUST BE ATTAINED WITH THE CONDITIONS SPECIFIED IN THE PERMIT TO ENSURE THAT HAZARDOUS CONSTRUMES ISSES 3.746-84-9-3) DO HOT EXCELLE THE PROMECHATED LIMITS (SEE 2.746-84-94)	PENTANIS TO ALL SIZES WITH LAND BABED HAZARDONS WASTE UNISE (SIRPACE IMPUUNDMENTS, WASTE PLES, LAND TIMATMINI UNITE, LANDINIES), TING BICCINGES ÉXISTING LAINI BABED ANGAÉ (I), CONTAMBIATUM	ACTION CHÉIMLAL
: ::	374 <b>6 64 93</b>	A.B	HAZARDOUS CONSTITUTITS IN GHOUND WATER, HAZ WASTE FAC	REQUIRES THAT PERMIT SPECKY HAZARDONIS CONSISSULINTS TO WISICH 1618 OROUND WATER PROJECTION STAIMARD OF 3/46-54-83 APPLIES HAZAIMOUS CONSTITUENTS ARE CONSTITUENTS RESISTING IN THE APPSINDS OF THIS MILE THAT HAVE BEEN IN TECTED HE QUICINIO WATER IN THE UPPERMANSE AQUIRER UNDERLYMIN THE UNITIES AND ARE MARBOHASTY EXPECTED TO DE MEDRIE HIVED FROM WASTE CONTAINED IN THE UNITIES.	PERTAMIS TO ALL SIPPS WITH LAND BASED HAPANIONS WASTS UNITS ISOMI ACE IMPOINDMENTS, VASSIL PRES, LAIRI THE ATMENT UNITS, LAIRPELESI, THIS INCLUDES SHISTING FAIR, BASED ANGAS OF CONTAMBIATION	JA SIM BES
	1749 84 94	A.B	CONCEPTERATION LIMITS FOR GROUND WATER: HAZ WASTE FAC	PRESENTS THE METHODOLOGY FOR DETERMANNIQ CONCENTRATION LIMITS AND ALTH HNATIVE CONCENTRATION LIMITS	PERTAINS TO ALL SITES WITH LAND BASED HAZARDOUS WASTE UNITS (SOIN ALE INFERRIDMENTS, WASTE PILES, LAND TREATMENT UNITS, LANDRILLS). THIS INCLUDES EXISTING LAND BASED AREAS OF CONTAMINATION.	CHIENING AL
PA DERR	3746 6 1 88	A,B	POINT OF COMPLIANCE FOR DROUND WATER, HAZ WASTE FACE	ESTABLISHES POINT OF COMPHANCE AT VERTICAL SURFACE LOCATED AT THE HYDRARICALLY DOWNGRADIENT LIMIT OF THE WASTL MANAGEMENT AREA THAT EXTENDS DOWNSENTO THE UPPERINDST ADMINES UNDER YORD SHE WRITES.	PERTAINS TO ALL SITES WITH LAND BASED MAZAMODUS WASTE UNITS ISSUED ACE IMPOUNDMENTS, WASTE PILES, LAND THEATMENT UNITS, LANDFILES, THIS INCLUDES EXISTING LAND BASED AREAS OF CONTAMINATION.	ACTION CHEMB, AL
POM DHIO E	3746 84 86	A.B.C	COMPLIANCE PERIOD FOR ORGUND WATER, HAZ WASTE FACH	A COMPLIANCE PERIOD DURING WHICH THE GROUND WATER PROTECTION STANDARDS APPLY WILL BE SPECIFIED IN THE PERMIT. RILE MEQUIRES THAT THE COMPLIANCE PERIOD FOR A PACILITY UNDERDOWN A CONRECTIVE ACTION PROGRAM WILL EXTEND WHITE IT CAN BE DEMONSTRATED THAT THE GROUND WATER PROTECTION ETANDARD OF OAC \$745.64.62 MAS NOT BETH EXCEDIBLED FOR A PI RIOD OF THIRE CONSECUTIVE YEARS.	PERFAINS TO ALL SITES WITH LAND-BASED ISAZARDOUS WASTE UNITS (NUMPACE IMPOUNDMENTS, WASTE PILES, LAND TREATMENT UNITS, FANDERS S), 75HS INCLUDED EXISTING LAND, BASED AREAS OF CONTAMINATION	CIMPAICAL ACTION
13.52	3746 84-87	Adl	GEN OROUND WATER MONITORING BI GUIRLMENTS; HAZ WASTL FAC	PRESENTS GENERAL ORDINIO WATER MONITORING PROGRAM REQUIREMENTS, HICLUDES HUMBER, LOCATION AND DEPTH OF WELLS, CABINU REQUIREMENTS, SAMPLING AND ANALYSIS PROMEDUILS, STI	PERTAINS TO ALL CITES WITH LAND BASED HAYARDOUS WASTF UNITS (SURFACE IMMOUNDMENTS, WASTE PIES, LAND THEATMENT UNITS, LANDFILLS). THIS INCLUDES EXICTURY LAND BASED AREAS OF CONTAMINATION.	CHEMICAL
AN-14-98	3745-84-98	A·I	GINDUND WATER DETECTION MONITORINU PROG; HAZ WARTE FAC	PRESENTS REQUIREMENTS OF GROUND WATER DETECTION PROGRAM	PERTAINS TO ALL SITES WITH LAND BASED HAZARDOUS WASTE UNITED SUMFACE IMPOUNDMENTS, WASTE PURS, LAND THEATMENT UNITS, LANDFILLS) AT WHICH MAZARDOUS CONSTITUENTS HAVE NOT BEEN DETECTED IN THE GROUND WATCH. THIS INCLUDES EXISTING LAND BASED AREAS OF	ACTION CHEMICAL

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ADMINIS. PERTINENT TITLE OR SUBJECT DESCRIPTION **APPLICATION** ARAR CODE 3 PARAGRAPH OF REGULATION OF REGULATION OF REGULATION TYPE SECTION CONTAMBIATION. 3745-54-99 GROUND WATER COMPLIANCE PRESENTS REQUIREMENTS OF GROUND WATER COMPLIANCE PERTAINS TO ALL SITES WITH LAND-BABED HAZARDOUS WASTE **ACTION** LA MONITORING PROG; HAZ WASTE FAC UNITS (SURFACE IMPOUNDMENTS, WASTE PILES, LAND CHEMICAL MONITORING PROGRAM. TREATMENT UNITS, LANDFILLS) AT WISICH HAZARDOUS CONSTITUENTS HAVE BEEN DETECTED. THIS INCLUDES EXISTING 46 LAND BASED AREAS OF CONTAMINATION. 3, PERTAINS TO ALL SITES WITH LAND-BASED HAZARDOUS WASTE ACTION PRESENTS THE REQUIREMENTS OF A GROUND WATER CORRECTIVE GROUND WATER CORRECTIVE ACTION 3745-85-01 WHITE ISUNFACE UMPOUNDMENTS, WASTE PILES, LAND CHEMICAL ACTION PROGRAM THAT PREVENTS HAZARDOUS CONSTITUENTS FROM PROGRAM; HAZ WASTE FAC A A EXCEEDING THEIR RESPECTIVE CONCENTRATION LIMITS AT THE TREATMENT UNITS, LANDFILLS) AT WHICH HAZAISDOUS CONSTITUENTS HAVE BEEN DETUCTED. THIS INCLUDED EXIGTING COMPLIANCE POINT BY BITHER REMOVAL OIL THEATMENT OF THILSE 4 LAND BASED AREAS OF CONTAMINATION. HAZARDOUS CONSTITUENTS. ω PERTAMIS TO ALL GITES WITH LAND-BASED HAZAHDOUS WASTE ACTION REQUIRES AN APPLICANT FOR A HAZARDOUS WASTE PERMIT TO CORRECTIVE ACTION FOR WASTE 3746 56 011 WHITE IBURFACE WAPOUNDMENTS, WASTE PILES, LAND INSTITUTE CORNECTIVE ACTION FOR ALL RELEASES OF HAZARDOUS MANAGEMENT UNITS THEATMENT WHITE, CAMPFILLS) AT WHICH HAZARDONS WASTE OR CONSTITUENTS FROM ANY WASTE MANAGEMENT WHY. CONSTITUENTS HAVE BEEN CREECTED. THIS INCLUDES EXISTING REGARDLESS OF THE TIME AT WHICH WASTE WAS PLACED IN SUCH LANG BASED AREAS OF CONTAMINATION. LDAIS PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE IS TO BE RECHIRES THAT ALL HAZARDOUS WASTE FACRITIES BE CLOSED IN A **GENERAL CLOBURE PERFORMANCE** 3745 56-11 A.B.C INCATED, STORED OR DISPOSED OF LOR HAS BEEN TREATED, MANNER THAT MINIMIZES THE NEED FOR FURTHER MAINTENANCE. STANDARD, HAZ WASTE FACIL STONED OR DISPOSED OF). CONTROLS, MINIMIZES, ELIMINATES OR PREVENTS POST-CLOSURE PSCAPE OF HAZARDOUS WASTE, HAZARDOUS CONSTITUENTS, LEACHATE, CONTAMINATED RUN-OFF OR HAZARDOUS WASTE DECOMPOSITION PRODUCTS TO THE GROUND OR SURFACE WATER OR THE ATMOSPHERE. DERI SUBSTANTIVE REQUIREMENTS PERTAIN TO ANY SITE AT WHICH ACTION SPECIFIES THE MINIMUM INFORMATION REQUIRED IN A C'OSURE PLAN CONTENT OF CLOSURE PLAN: HAZ HAZARDOUS WASTE IS TO BE TREATED, STORED ON DISPOSED 3748-56-12 FOR OHIO EPA TO DETERMINE THE ADEQUACY OF THE PLAN. WASTE FACILITIES OF (OR HAS BEEN TREATED, STORED OR DISPOSED OF). 4 EP PERTAING TO ANY BITE AT WHICH HAZAMDOUS WASTE IS TO BE ACTION REQUIRES THAT ALL CONTAMHATED EQUIPMENT, STRUCTURES AND THEATED, STORED OR DISPOSED OF (OR HAS BEEN TREATED, DISPOSAL/ DECOM OF EQUIPMENT, 3746-58-14 SOR & BE PROPERLY DISPOSED OF OR DECONTAMINATED. REMOVAL OF ٥ STRUCTURES & SOILS STORED OR DISPOSED OFF. OHI HAZARDOUS WASTES OR CONSTITUENTS FROM A UNIT MAY CONSTITUTE GENERATION OF HAZARDOUS WASTES PERTAINS TO ALL SITES WITH LAND BASED HAZARDOUS WASTE 200 SPECIFIES THE POST-CLOSURE CARE REQUIREMENTS, MICHEDING UNITS ILANDFILLS AND SURFACE IMPOUNDMENTS, WASTE PILES, POST-CLOSURE CARE AND HISE OF 3745-55-17 MAINTENANCE, MONITORING AND POST-CLOSURE USE OF PROPERTY. LAND THEATMENT UNITS AND TANKS THAT MEET REQUIREMENTS PROPERTY IL. OF LANDFILLS AFTER CLUSURE). THIS INCLUDES EXISTING LAND BASED AREAS OF N LD CONTAMINATION. n PERTAINS TO ALL SITES WITH LAND-BASED HAZARDONS WASTE PRESENTS THE INFORMATION NECESSARY FOR OHIO EPA YO DETERMINE UNITS (LAMOFILLS AND SURFACE IMPOUNDMENTS, WASTE PILES, POST-CLOSURE PLAN 3746-55-18 THE ADEQUACY OF A POST-CLOSURE PLAN. LAND TREATMENT UNITS AND TANKS THAT MEET REQUIREMENTS Ō OF LAMUFILLS AFTER CLOSURES. THIS INCLUDES EXISTING 14 LAND-BAGED AREAS OF CONTAMINATION.

### OHIO ADMINISTRATIVE CODE GREINER'S LAGOON

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PACE	ADMINIS CODE SECTION	PERTINENT PAHAGRAPH	TITLE OR BUILDECT OF HEQUIATION	DESCRIPTION OF REQUESTION	APP, ICATION OF REQUIATION	ANAR TVIII
	7746 S		MOTICA TO LOCAL LAID AUTHORITY	MEDIUMES THAT A MELOND OF THE TYPE, LOCATION AND QUANTITY OF THARARDOUS WASTES INSPUSED OF HIS EACH THAT BE ENBARETTED TO THE LOCAL LAIRD AUTHORITY AND THE DIRECTOR OF THE OIGO FFA.  ALSO REDIBINES THAT A POTATION TO THE SEED TO THE FACRITY PROPERTY BE MADE INDICATION THAT THE LAND WAS USED TO MANAGE HAZARDOUS WASTES AND THAT CERTAIN USE INCITIONS MAY APPLY TO THE PROPERTY.	PLRIAMS TO ALL SIECE WITH LAND BASED HAZARDDUS WASES DIRSE ILANDRALD AND SHREACE IMPOUNDMENTS, WASES RES. CAND TREATMENT WHITE AND TANKS ISLAT MEST REQUIREMENTS OF LANDRES AFTER CLOBURES, 1986 HILLUDES SAISTING LAND MASED AREAS OF CONTAMINATION.	ACTION
1-3146	3746 86 71		CONDITION OF CONTAINING	CONTAINERS HOLDING HAZARDONS WASTE MUST BE MARITAINED BE BOOD CONDITION BIO 18151 OR STRUCTURES 1817 ECTS	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE STUHED BE CONTAINENS	At-TION
649-5	1746 88 77		COMPARIMETER OF WARTE WITH CONTRACTOR	TIAZAMIDING WADDES PLACED HE CONEAIMEN MINEE HIST REACT WITH THE CONEANGENISM NACEDIAL ON LINER MARIEMIAL	PERCAND TO ANY SIES AT WRICH HASARDONS WASTS WILL BE STUDIED IN CONTAINERS	ас тији
 0	3746 66 73		PARITATH MEETS OF CONTAINING	CONTAINERS INCOMO HATAMBIUS WASTE SAIST BE CEOLED IFRE FPE TO ADD ON NEMOVE WASTES AND MISS HOT BE TRANSIED HE A MAINTEN HEAT MAY HUPTONE THE CONTAINER BUT CAULE IT TO FEAR	PENEZHE TO ANY SEE AS WEICH NAZARDONS WARTE WILL DE CECHILI: HI CONSAMERS	AC 18091
	3/45 bb 74		COMENINER WERE CTIMES	ARDIMES AT LEAST WERELY INSPECTIONS OF CONTAINER STORAGE AREAS	PERFAMIL EO AMY DITE AS VANCELHAZARDONS VASSE IVEL UL DECIR D HE COM) ARRES	ac thui
	1748 80 76	A,B,G,D	CONTAINER STORAGE AREA CONTAINERS STORAGE	NEGUMES THAT CONTAINER STORAGE AREAS HAVE A CONTAINMENT SYSTEM AND SPECIFIES THE ABBINGURA RECARDERACITES OF SUCCESS SYSTEM.	FERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL SE STORED BY CONTAMERS	ACTION
DERR	3146 66 76		CONTAINER REQUIREMENTS FOR	PRESENTS GENERAL PRECAUTIONS TO SETAKEN TO PREVENT ACCIDENTAL IGNIFIGN OR REALTION OF IGNITABLE ON BEAUTIVE WASTES THAT WILL BE STORED IN CONTABLENG	PERTANS TO ANY SITE AT WHICH POTENTIALLY REACTIVE OR KINITAME WAS LES THAT ARE STORED, DR ARE TO BE STORED, IN CONTAINING	ACTION CINEMICAL
EPA	3746 66 77	A,9.C	CONTAINEN REQUIREMENTS FOR	PRESENTS GENERAL PRECAUTIONS TO SE TAKEN WHEN IX ALTIM WITH INCOMPATIBLE WASTES	PERTABLE TO ANY BITE AT WHICH POTENTIALLY INCOMPATIBLE WASTEG ARC PHI SENT	ACTION LEIEMICAL
0110	3746 66-70		CONTAINER CEDRUHE REQUIREMENTS	SPECIFIES CLUSTIFE MEDIJINEMENTS FOR CONTAINENS AND LONTAINMENT SYSTEM	PERTAINS TO ANY SITE AT WHICH HATARDOUS WASTE WILL BE STORED BE CONTAINENS	ACTION
E3 FRON	3748 66 81	A.9.D	ABBERBASHT OF EXISTING TANK BYETFIAL INTO CHITY	REQUIRES THAT EACH EXISTING TANK USED TO STORE ON THEAT HAZANDOUS WASTE THAT DOLE NOT HAVE BECONDARY CONTAINING HE BE STORED TO ABSURE TANK INTO ORDER	PERFARE TO ANY SITE WHICH HAS EXISTING HAZANDOUS WAILLE THE ATMENT ON STURAGE TANKS THAT LACK LICUMBARY CONTAINMENT.	AGNOH
98 13	3746 66-92	<b>A·O</b>	PARTIME OIL COMPONENTS DEBIGIN & INSTALLATION OF HEM TANK	REQUIRES A SECONDANY CONTAINMENT SYSTEM FOR TANKE AND AGRESSMENT TO DETERMINE TANK INTEGRITY	FINITIONS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE EITHER STORED ON THEATED BY TANKS.	ACTION
- 4 L - N4	3745-56-93	A-0,1	CONTAINMENT AND DETECTION OF RELEASES FOR TANK SYSTEMS	REQUIRES SECONDARY CONTAINMENT AND LEAK DETECTION SYSTEMS FOR TANKS.	PERTAINS TO ANY SITE AT WHICH HAZARDONS WASTE WILL BE EXCUEN LICONED OR INEATED IN TANKS	ACTION .

## OHIO INISTRATIVE CODE ( ARAH)

PAGE	ADMINIS. CODE SECTION	PERTINENT PARAGRAPH	TI'LE OR SUBJECT OF REGULATION	DESCRIPTION OF REGULATION	APPLICATION OF REGULATION	ARAR TYPE
	3745 66 84	A,8,C	GENERAL OPERATING REQUIREMENTS ' FOR YANK BYSTEMS	SPECIFIES GENERAL OPERATING NEGUINEMENTS FOR TANK SYSTEMS.	PERTAINS TO ANY BITE AT VANCH HAZARDOUS WASTE WILL BE EITHER STORED OR TREATED IN TANKS.	ACTION
	3746-56-95	A-D	INSPECTIONS OF TANK SYSTEMS	REQUIRES INSPECTIONS AT LEAST ONCE FACH OPERATING DAY.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE EITHER STORED OR TREATED IN TANKS.	ACTION
4+3146	3745 56-98	A,0,C,E	RESPONSE TO LEAKS ON SPHES OF TANK SYSTEMS	REQUIREB THAT UNFIT TANKS BE REMOVED FROM USE AND FURTHER HELEASES BE PILLVENTED.	PERTAINS TO ANY BITE AT WHICH HAZARDOUS WASTE WILL BE EITHER STORED OR TREATED IN TANKS.	ACTION
14+64	3745 56 87	A.8	CLOSUNG AND POST OLOSUNG CARE FOR TANK SYSTEMS	RPECIFIES CLOSUME AND POST-CLOSUME HEOLIMEMENTS FOR TANK SYSTEMS.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE LITHER STORED OR THEATED IN TANKS.	ACTION
10.6	3748-56-98		TANK REMUREMENTS FOR IGNITABLE/REACTIVE WASTES	PRESENTS GENERAL FRECALTHONS TO BE TAKEN TO PREVENT ACCIDENTAL IGNITION ON HEACTION OF MINITABLE OR REACTIVE WASTES THAT ARE TREATED OR STORED IN TANKS.	PERTAINS TO ANY BITE AT WHICH POTENTIALLY REACTIVE OR IGNITABLE WASTES I HE STORED OR TREATED (OR TO BE STORED ON TREATED IN EXISTING TANKS.	ACTION
	3745-66-88	A,B	TANK REQUIREMENTS FOR HICOMPATIBLE WASTES	PRESENTS GENERAL PRECAUTIONS TO BE TAKEN WHEN DEALERS WITH POTENTAILLY NICOMPATIBLE WASTES THAT ARE STORED OR TREATED IN TAIKS.	PERTAINS TO ANY SHE AT WINCH POTENTIALLY INCOMPATIBLE WASTES ARE STORED OR TREATED FOR TO BE STURED ON TREATED IN TANKS	ACTION
	3746 68-21	A-O	DESIGN & OPERATING REQUIREMENTS ; SUMFACE IMPOUNDMENTS	PRESENTS DESIGN AND OPERATING CRITERIA FOR SURPACE IMPOUNDMENTS.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE TREATED OR STORED WI SURFACE IMPOUNDMENTS (LAGOONS). PERTAINS TO SITES WHICH HAVE SURFACE IMPOUNDMENTS THAT WILL GIOT BE (OR HAVE NOT BEEN) CLEAN CLOSED.	ACTION
A DERR	3745-86-28	A, B, C	MONITORING & INSPECTION OF SURFACE IMPOUNDMENTS	REQUIRES INSPECTION OF LINERS DURING CONSTRUCTION. ALSO REQUIRES WEEKLY AND AFTER STORM INSPECTIONS.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE THEATED OR STORED IN SURFACE IMPOUNDMENTS (LAGOOMS). PEHTAINS TO SITES WHICH HAVE SURACE IMPOUNDMENTS THAT WILL NOT DE (OR HAVE NOT BEEN) CLEAN CLOSED.	ACTION
OHIO EP	3745-56-27	A-E	emergency repairs & Contingency Plans : Surface II Pound	SPECIFIES WHEN AND HOW SURFACE IMPOUNDMENTS SHOULD BE REMOVED FROM SERVICE FOR REPAIRS.	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL SE THEATED OR STORED IN SURFACE IMPOUNDMENTS (LAGODNS). PERTAINS TO SITES WHICH HAVE SURACE IMPOUNDMENTS THAT WILL HUT BE IOR HAVE NOT BEEN! CLEAN CLOSED.	ACTION .
3 FROM:	3746-56-28	A,B,C	CLOSURE & POST-CLOSURE OF SURFACE IMPOURDMENTS	PROVIDES CLOSURE AIM POST-CLOSURE REQUIREMENTS FOR SURFACE IMPOUNDMENTS	PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE TREATED ON STORED IN SURFACE IMPOUNDMENTS (LAGOONS). PLHTANIS TO BITES WHICH HAVE SURACL! IMPOUNDMENTS THAT WILL NOT BE (OR HAVE NOT BEEN) CLEAN CLOSED.	ACTION
1-98 13:5:	3746-66-29	A,8	SUNFACE IMP. REQUIREMENTS FOR IGHITAOLEMEACTIVE WASTES	PRESENTS DENEMAL PHYCAUTIONS TO BE TAKEN WHITH DEALING WITH POTENTAILLY IONITABLE ON REACTIVEE WASTES THAT ARE STORED ON TREATED IN SURFACE IMPOUNDMENTS.	PERTAING TO ANY SITE AT WHICH POTENTIALLY IGNITABLE OR HEACTIVE HAZARDOUS WASTE WILL BE TREATED OR GTORED IN SURFACE IMPOUNDMENTS (LAGODNS). PERTAINS TO SITES WHICH HAVE SURFACE IMPOUNDMENTS THAT WILL HOT BE FOR HAVE NOT BEEN CLEAN CLOSED.	ACTION CHEMICAL

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#### OHIO ADMINISTRATIVE CODE ( **GREINER'S LAGOON** ٠,

**FANDUSKY COUNTY** 

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ADMINIS. THREE TRAPP CODE TITLE OR SUBJECT U DESCRIPTION APPLICATION **IMANOARA** AHAH SECTION INNITATION TO OF REGULATION OF HEGULATION TYPE 1746 88 30 SIMILACE HAPOLIND INCOMMENTS PRESENTS USINGAL PROCAUTIONS TO BE TAKEN WHEN DEALING WITH PERTARG TO ANY SITE AT WHICH POTENTIALLY RECOMPATIBLE ACTION TON IN GIAPATINE WASTES POTENTARLY INCOMPATIBLE WARTES THAT ARE STORED ON THE ATED HATARIPOUS WASTE WILL BE TREATED ON STORED HI SURFACE CHEMICAL WI BLHIFALE IMPOURDMENTS IMPOUNDMENTS (LAUGONS) PENTANG TO SITES WHICH HAVE BURACE IMPOUNDMENTS THAT WILL NOT BE KNIL HAVE NOT BEEN CLEAN CLUBED 3748 86 31 CONSTRUCTION WEPECTIONS OF ALLOWS DING SPA OPPORTUNITY TO INSPECT SURFACE PERTAINS TO ANY SITE AT WHICH HAZARDOUS WASTE WILL BE Ø ACTION BUSIFACE INSPINIONMENTS MAPOUNDAMENTS DURING CONSTRUCTION AND INSTALLATION THEATED ON STONED HI SUMFACE HAPDUHOMENTS ILAGOONS) 4 5 PERTAMIS TO SITES WARCH HAVE SURACE MAPOUNOMENTS THAT WELL HUT BE IOR HAVE NOT BEEN) CLEAN CLOSED ø 1746 66 33 A.B SPECIAL REQUIREMENTS FOR "F" PROBBITS THE PLACEMENT OF HAZARDOUS WAS ILE FOZO, FOZI, FOZZ. PERFAMS TO ANY SITE AT WHICH HAZARDOUS F WASTE AND ACTION Φ WASTER HE BURE ALL IMPOUND FOLL FOLE AND 1927 HE SING ACE IMPORTUNES HES THE ATED OR STUNED HE SURPACE HAPOUHUMENTS HAGDONS! CAIL MIC. AL PLICE AND TO BLUES WINCH HAVE BURACE MAPOUNDMENTS THAT v WHE HOT BE FOR HAVE NOT BEEN CLEAN CLOSED 3746 67 01 ENVIRONMENTAL PERFORMANCE O SPECIFIE LOCATION, DESIGN, CONSTRUCTION, OPERATION. PERTAINS TO ALL BITES THAT ENTHER HAVE OR WEL HAVE AT AC TION STANDARDS, LANG BASELI CHIES SAANSTENANCE AND CLOSURE REQUIREMENTS FOR LAIMINGES, WASTE LEAST ONE OF THE FOLLOWING WHITE ON LIFE, LANDING S. THE S. BUM ACE HARDSHIPMAN IN A HID CHICA ROBOTHRY WERE FION WALLS FILLS, SUBJACE IMPOUNDMENTS, LAND THEATMENT WHILE TACK IFF & APP ORDERONOUND MID CROW WELL STIRE INCLUDES EXI. THIS LAND BASED AREAS OF CONTAMINATIONS 1745 67 01 ΑI LAMPIRE DESIGNAMO OPERATINO PIM SPIJES OF SIGH AND OPPRATING PRODUMENERS FOR LAUDINGS PENTANNE TO ALL SITES AT WHICH A HAZARODUS WASTE ACTION ALCOURT METER LANIMILL WILL EITHER BU LOCATED ON AN EXISTING LANDING RECLUMES LYIST, LEAGHARS COLLECTION AND REMOVAL NOR OWNER OF CONTROL, LTC. WILL BE EXPANDED THIS RULE ALBO PERTAINS TO EXISTING LAMO BASED AREAS OF CONTAMBIATION 1146 57 06 MOINTONING AND HISPECTIONS OF REQUIRES INSPECTION OF LANDERS & DUBING CONSTRUCTION OR PERTAINS TO ALL BITES AT WHICH A HAZARDOUS WASTE AC TION LANDFILLS INSTALLATION AND OFFRATION LAMBELL WILL CITHER BE LOCATED OR AN EXISTING LAMBERS U. WILL BE EXPANDED. THIS RULE PERCAINS TO EXISTING ш LAND DASID AREAS OF CONTAMINATION ā ACTION PERTAINS TO ALL SITES AT WHICH A HAZARDOUS WASTE 3746 67 10 AB LAMBFILL CLOSURE AND POST CLOSURE SPECIFIES CLOSURE AND POST CLOSURE REQUIREMENTS FOR LANGERT WILL ERRICK BE LOCATED OR AN EXISTING LANDFILL HAZANDOUS WASTE LANDISES INCLUDES FINAL L'OYEN AND ш CANE WILL BE EXPANDED THIS RULE PLATABLE TO EXISTING MANITEHANCE ٥ LAND BASED AREAS OF CONTAMINATION ō PERTAINS TO ALL SITES AT WHICH POTENTIALLY MINITABLE OR ACTION PROMINES THE DISPOSAL OF IGNITABLE OR REACTIVE WASTE IN A 3748 67 12 A.B LANDING REQUIREMENTS FOR CHEMICAL HI ACTIVE HAZARDOUS WASTE MAY BE LANDFILLED LANDENL, WILLES THE WASTE IS THEATED, MENDERCO OR MIXED SO I IGHITAM E/NEACTIVE WASTER THAT THE RESULTANI MATERIAL NO LUNGER MILETS THE DEFINITION DE Ö Ō. IGHITABLE OR MACTIVE WASTE. íı, **ACTION** INHAMIS TO ALL SITES AT WHICH POTENTIALLY MICHIPATION 3746 67-13 LAMBERT REQUIREMENTS FOR PROBLEMS THE DISPOSAL OF INCOMPATIBLE WACTE HE THE CAME CLIC CHIMICAL HAZAMINUL WASTE MAY BE LANDERLED INCOMPATIBLE WASTER OF A LANDFILL. m PERFAINS TO ALL SITES AT WHICH A LIQUID HAZARDOUS WARTE ACTION THE PLACEMENT OF BULK OR NON-CONTAINERIZED LIQUID HAZARDOUS LAIMFILL REQUIREMENTS FOR HILLE & 0 3745 57-14 A D OR HAZAHDOUS WASTE CONTAINING FREE LIQUIDS AND WASTE OF HAZARDOUS WASTES CONTAINING FREE FIBURE (WHETHER CONTAMERIZED LIQUIDS CONSMITHED FOR LANDFILLING OR NOT ABSORDANTS HAVE BEEN ADDED) IN ANY LANDFILL IS 4 PROHIBITED.

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PAGE	AOMINIS. CODE SECTION	F_RTINENT PARAGRAPH	TITLE OR SUBJECT OF REGULATION	DESCRIPTION OF REGULATION	APPLICATION OF REGULATION	ARAR TYPE
-	3745 67-15	A.B	LANDFILL REQUIREMENTS FOR CONTAINERS	UNILESS THEY ARE VERY SMALL, CONTAINERS MUST EITHER DE AT LEAST 90% FULL WHEN PLACED IN THE LANDFILL OI, CRUSHEDISHREDDED PHOR TO PLACEMENT IN THE LANDFILL.	PERTAING TO ALL GITES AT WHICH A HAZARDOUS WAGTE LANDFILL WILL BITTIER BE LOCATED ON AN EXISTING LANDFILL WILL BE EXPANDED AND CONTAINERS ARE TO BE DISPOSED OF IN THE LANDFILL.	ACTION
146	3746-67-16	A-E	DISPOSAL OF SMALL CONTAINERS OF HAZ WASTES IN OVERPACKS	LAB PACKS CONTAINING NAZARDOUS WASTE MAY BE PLACED UI A LANDFILL IF CERTAIN REQUIREMENTS ARE MET.	PERTAINS TO ALL SITES AT WHICH A HAZARDOUS WASTE LANDERL WILL EITHER BE LOCATED OR AN EXISTING LANDFILL WILL BE EXPANDED AND LAW PACKS ARE TO BE PLACED IN THE LANDFILL.	ACTION
4+544+3	3746-67-17	<b>A</b>	Landfill Construction inspections	ALLOWS OND EPA OPPORTUNITY TO INSPECT LANDFILL DURING CONSTRUCTION.	PERTAINS TO ALL SITES AT WHICH A HAZARDDUS WASTE LANDFILL WILL EITHER BELOCATED OR AN EXISTING LANDFILL WILL BE EXPANDED. THIS RULE PERTAINS TO EXISTING LAND-BASED AREAS OF CONTAMINATION.	ACTION
10:614	3745-87-18	A.B	SPECIAL REQUIREMENTS FOR "F" WASTES IN LANDERLIS	PROHIBITS THE PLACEMENT OF HAZARDOUS WASTES FO20, FO28, FO22, FO23, FO28 AND FO27 BLE ANDFILLS.	PERTABLE TO ALL GIVES AT WHICH A HAZARDOUS WASTE I ANDHILL WILL BITHER BE LOCATED OR AN EXISTING LANDFILL WILL BE EXPANDED AND F-WASTES ARE BEING CONSIDERED FOR I ANDFILLING	ACTION CHEMICAL
	2715 67-91	A,B,C	ENVIRONMENTAL PERFORMANCE STANDARLS FOR MISC UNITS	ESTABLISHES LOCATION, DESIGN, CONSTRUCTION, DEFIATION, MAINTENANCE AND CLOSURE REQUIREMENTS FOR BRISCELLARGOUS UNITS USED TO TREAT, STORE OR DISPOSE OF HAZARDOUS WASTES.	PERTAINS TO ANY ALTERNATIVE THAT INCORPORATES TREATMENT, STORAGE OR DISPOSAL OF HAZARDOUS WASTES IN MISCELLANEOUS UNITS.	ACTION CHEMCIAL
	3745 59:01	C.£	Hazard Wastes Restricted Prom Land Disposal-Exceptions	LISTS TYPE OF RESTRICTED WASTES THAT MAY BE LAND DISPOSEU. LISTS TYPE OF HAZARDOUS WASTES NOT SUBJECT TO LOIS.	PERTAINS TO ANY ALTERNATIVE THAT INCORPORATES DISPOSAL OF HAZARDOUS WASTES ON BITE	ACTION
A DERR	3746-89 03	A.B	Dilution prohibited as a substitute for treatment	PROHIBITS DILUTION OF A RESTRICTED WASTE OR THE RESIDUAL FROM TREATMENT OF A RESTRICTED WASTE AS A SUBSTITUTE FOIL ADEQUATE TREATMENT IN ORDER TO LAND DISPOSE HAZARDDUS WASTE. DILUTION OF WATER WASTES IS NOT IMPERMISSIBLE INITITION UNLESS A METHOD HAS BEEN SPECIFIED AS A TREATMENT STANDARD.	FERTAINS TO ANY ALTERNATIVE THAT INCORPORATES DISPOSAL OF HAZARDOUS WASTE ON-617E.	ACTION
OHIO EPA	3745-59 07	A,B,C	Waste analysis of Hazandous Waste	DENERATOR SHALL TEST THE WASTE OR TEST AN EXTRACT OF THE WASTE ACCORDING TO THE FREQUENCY AND TEST IS ETHORS DESCRIBED IN THE RULES, TO DETERMINE IF THE WAIJE IS RESTRICTED FROM LANAD DISPOSAL.	PERTAINS TO AN ALTERNATIVE THAT INCORPORATES DISPOSAL OF HAZARDDUS WASTE ON-617E.	АСТЮН
S4 FROM	3745 59 OB	B,C	SPECIAL HULES REGARDING WASTE THAT EXHIB A CHARACTERIST	PROHIBITE LAND INSPOSAL OF CHARACTERISTIC WASTE UNLESS THE WASTE COMPLIES WITH THE TREATMENT STATIOARDS OF LISTED WASTER. IF THE WASTE IS BOTH LISTED AND EXPORTS A CHARACTERISTIC, THE THRATMENT STANDARD FOR THE LISTED WASTE WILL OPERATE IN LIEU OF THE STANDARD FOR THE CHARACTERISTIC WASTE.	PENTANIS TO ANY STIE IN WHICH ON SITE DISPOSAL OF HAZANDONIS WASTE IS AN ALTERNATIVE.	HOTTON CABERD
14-98 13	3745-69-30	A.B,C	WASTE SPECIFIC PROHIBITIONS	PRONIBITS OPENT SOLVENT WASTES OR CONTAMINATED SOIL AND DEBRIS RESULTING FROM A RESPONSE ACTION UNDER CERCLA ON RCRATO BE LAND DISPOSED UNILESS GENERATOR MEETS THEAT MENT STANDARDS 13748-69-40 TO 44) OR HAS BEEN GRANTED A	PERTAINS TO ANY SITE IN WHICH ON-SITE I AND DISPOSAL OF HAZARIMULE WASTE IS AN ALTERNATIVE	ACTION CHEMICAL

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### OHIO ADMINISTRATIVE CODE (C. ARANA

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PACE	ADMINIS. CODE SECTION	PERTINENT PARAGRAPH	TITLE OR BUDJECT OF REQULATION	DESCRIPTION OF REGULATION	APPLICATION OF REDUKATION	ARAR
•	1/46 69 31	A B,C.U	DIOXIII WASSE PROBURTONS	PROBLET STATE OF CASE OF CONTROL OF CASE OF STATE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF CASE OF C	PERTAINS TO ANY SITE IN WHICH ON SITE LAND DISPUSAL OF DIOXIN WASTERS AN ALTERNATIVE	CHEMICAL
46	3146 69 33	A,O,E #	California List Wasees Prohibitions	PROMETTS LAND DISPOSAL OF FOLLOWING WASTES:  1. LIQUID WASTES WITH PIR 2 ON PIR = 2  2. LIQUID WASTES CONTAINING POSE WITH CONC = 80 OR CONC > 60  PPM  3. LIQUID WASTES WITH HALOGENATED DROANIC LOADING OF DR. =	PERTAINS TO ANY SITE IN WHICH ON SITE LAND DISPOSAL OF MIS OR HOU CONTAMINATED WAS IT IS AN ACTERNATIVE	Coulding
e				1000mg/i ANU LESS SISAN 10,000 aug/		
-644	1746 84 77	A 8,C 0,F F,G	FIRST TOURD YZABIES PHONIBISHOUS.	PROINSTS ON SITE LAIN DISPOSAL OF FIRST THRO WASTES UNITES REQUIREMENTS OF PAHACINAPHS OF F.O. AMERIC	PERTAINS TO ANY SIES IN WHICH ON SITE LAND INSPUSAL OF EMAIL SHIPE HAZARIMHE WAS ISSUES AS AS REPRATIVE	CHIMICAL ACTION
5 6:4	3745 60 04	A 21	RECOND THIN WASTER MINHBIERING	PROHIBITS ON SITE LAND CHEPOSAL OF SECOND GRIPH WASTES WHEELS IN DUMBERS OF PARAMAPHS U.S.F.O AMESAST	FERTAINS TO ARY SITE OF WHILLIEON SITE FAMIL DISPOSAL OF MELT OF A PERSON OF A PRINCIPLE OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF TH	CHEMBLAL ACTUHA
	3746 69 36	AI	THIRD THIRD WASTER PROHIBITIONS	PROBBITE ON SITE FAIR DISPOSAL OF TURNO TIBILD WASTES INTESES. REQUIREMENTS OF PARAMBAPHS D.E.F.O ARE MET.	PETITADIS TO ANY BITE IN WITHER ON BITE LAIN DISPOSAL OF THIRT THIRT HAVABLE WAS AS ALL IN MINISTERS	CHEMICAL AL MON
DERR	1745 R9 4U	A.B.G	APPLICABEITY OF THUATIMENT &: AND ANDS	PROHIBITE DIX SITE LANG CHEPOSAL OF RESTRICTED WASTE UNLESS THE WASTE IS TESTED USING TEST ARTHOR IN THE APPENDIX TO MILLI DAG 3746-71-74 DIX THIS BLAL AND THE CONCENTRATION OF ARTY MAXIMIDIUS CONSTRUCTED GOAS NOT EXCELD THE CONCENTRATION SHOWN IN TABLE COW OF HURE 3748-89-41 OR TABLE COVOIT MILLI 3748-89-42. A WASTE INTESTED WHICH A TECTHOR GOY SPECIFIED UNION RURE 3748-89-42. A WASTE INTESTED WHICH A TECTHOR GOY SPECIFIED UNION RURE 3748-89-42.	PERTAINS TO ANY SITE IN WHICH ON SITE LAND DISPOSAL OF MESTING SED WAS IN MAY BE AN ALTERNATIVE	CHS MICAL ACTURE
EPA DE	3746 69 41	<b>A</b>	THEATMENT STANDARDS AS CONCENTRATIONS IN MASTE SYSHACTS	RESTRICTED WASTE SHOULD BE TREATED TO CONCENTRATION LEVELS BPECIFIED IN THIS HULE USING TEST METHOD IN 1816 APPENING TO HULE 3746 BE-24 ON THE APPENING TO BUILE BI46 58 40	PERTAINS TO ARY SITE IN WHICH ON SITE LAND DISPOSAL OF HEBITALLIED WASTE IS AN ALTERNATIVE	( HEBAIL AL
0110	2748 49 42	A,C,D	THEATMENT STANDARDS EXPRESSED AS SPECIFIED TECHNOLOGIES	ESTABLISHES TREATMENT STANDARDS FOR LIQUID HAZARDDUL WASTE CONTAINING PORT, INDICTIQUED HAZARDDUS WASTE CONFAINING HALOGENATED ORGANIC COMPOUNDS HIGGS) AND LAW PACKG HADIDACTIVE HAZARDDUS MIRT IP WASTES ARE JOUT SIDS HE CT TO	PERTAINS TO ANY SITE IN WHICH ON-SITE TREATMENT AND DISPOSAL OF HAZARDOUS WASTE CONTAMINO SITHER FCS LIQUID WASTE MIGHT TAKE PLACE	ACTION CIREMICAL
3 SS FROM	2748 89 43	A,8,6	TREATMENT STANDARDS EXPRESSED AS WASTE CONCENERATIONS	THEATMENT STANDANDS  THEATMENT THE RESTRICTED WASTES AND THE CONCENTRATIONS OF THEM ASSOCIATED HAZARDOUS CONSIDERTS WHICH MAY HOT US EXCEVOED BY THE WASTE OF TREATMENT DESIRED FOR THE ALLOWARDS AND THE WASTE OF THE ALLOWARDS AND THE WASTE OF WASTE OF MESHALIN	PERTAINS TO ANY SITE IN VAIICH ON SITE TREATMENT AND NULL PRICE OF RESTRICTED WASTE IS AN ALTERNIATIVE	CERPAICAL
14-98 1	3746-80 80	A,0,C,D.E	PROHIBITION ON STORAGE OF MESTRICTED WASTE	PHOHIBITE ON BITE STIMAGE OF HAZANDOUS WASTER RESTRICTED FROM LAND DISPOSAL BEYOND A SPECIFIED TIME FRAME STATED IN THE RULE.	PERTAINS TO ANY SITE IN WHICH STORAUS OF HAZARDOUS WASTE WAL DECUM ON SITE TO FACILITATE PROPER RECOVERY, THE ATRIALT ON DISPOSAL. IN SOME CASES STUMADE OF RESTRICTED WASTES BEYOND ONE YEAR IS ALLOWED.	

## OHIO TINISTRATIVE CODE (C. ARAR. SANDUSKY C. ATY

PACE	ADMINIS. CODE SECTION	PERTINENY PARAGRAPH	TII LE OR SUBJECT OF REGULATION	DESCRIPTION OF REGULATION	APPLICATION OF REGULATION	ARAR TYPE
	3745-66 11	A,8	CLOSUME PERFORMANCE STANDARD	OWNER SHALL CLOSE FACILITY IN MANNER THAT MINUMIZES HEED FOR FURTHER MAINTENANCE AND REDUCES OR ELIMINATES POLLUTION OF GROUND WATER, SURFACE WATER OR ATMOSHPERE.	CONSIDER FOR REMEDIAL PLANS THAT MAY REQUIRE EXTENDED OPERATION AND MAINTENANCE OF EQUIPMENT. CONSIDER ALTERNATIVES WITH LESS LONG-TERM OBM. APPLICABLE FOR RCRA FACILITIES, APPROPRIATE AND RELEVANT FOR OTHER SITES.	
116	3745-61-11	A,B.C	MAXIMUM CONTAMINAPIT LEVELS FOR INORGANIC CHEMICALS	PRESENTS MAXIMUM CONTAMINANT LEVELS FOR INORGANICS.	PERTAINS TO ANY SITE WHICH HAS CONTAMINATED GROUND OR SURFACE WATER THAY IS EITHER BEING USED, OR HAS THE POTENTIAL FOR USE, AS A DRINKING WATER SOURCE.	CHEMICAL
+644+3	3746-81-12	A, <b>B</b> ,C	MAXIMUM CONTAMINANT LEVELS FOR ORGANIC CHEMICALS	PRESENTS MCLS FOR ORGANICS.	PERTAME TO ANY SITE WHICH HAS CONTAMINATED GROUND OR SURFACE WATER THAT IS SITHER BEING USED, OR HAS THE POTENTIAL FOR USE, AS A DRINKING WATER SOURCE.	CHEMICAL
D:614	3746-81-13	U,A	not 238vaj taanimathext mumikam Veichbrut	PRESENTS MICES FOR TURBIDITY.	PERTAINS TO ANY BITE WHICH HAS CONTAMINATED GROUND OR SURFACE WATER THAT IS EITHER BEING USED, OR HAS THE POTENTIAL FOR USE, AS A DRINKING WATER SOURCE.	CHEMICAL
	3746-81-14	A-E	MAXIMUM MICROBIOLOGICAL CONTANINANT LEVELS	PRESENTS MCLS FOR MICRODIOLOGICAL CONTAMINANTS	PERTAINS TO ANY SITE WHICH HAS CONTAMINATED GROUND OR SURIFACE WATER THAT IS EITHER BEING USED. ON HAS THE PUTENTIAL FOR USE, AS A DRINKING WATER SOURCE.	CHEMICAL
	3745-81-21	A,B	MICRUBIOLOGICAL CONTAMINANT SAMPLING & ANALYTICAL REQ	PRESENTS SAMPLING AND ANALYTICAL HEQUIREMENTS FOR MICHOBIOLOGICAL CONTAMINANTS.	PERTAINS TO ANY 61TE WHICH HAG CONTAMINATED QUOUND OR SURFACE WATER THAT IS EITHER BEING USED, OR HAS THE NOTENTIAL FOR USE, AS A DRINKING WATER SOURCE.	CHEMICAL
8	3746-81-22	A.B	TUBIDITY CONTAMINANT SAMPLING & ANALYTICAL REQUIREMENTS	PHESENTS SAMPLING AND AMALYTICAL REQUIREMENTS FOR TIMINIDITY.	PERTAINS TO ANY SITE WHICH HAS CONTAMINATED GROUND OR SUNFACE WATER THAT IS EITHER BEING USED, OR HAS THE POTENTIAL FOR USE, AS A DRINKNIG WATER SOURCE.	CHEMICAL
EPA DERR	3748-81-23	A,E	Inorganic Contaminant Monitoring Requiremnents	Presents monitoring requirements for inorganic contaminants.	PERTAINS TO ANY SITE WHICH HAS CONTAMINATED GROUND OR SURFACE WATER THAT IS EITHER BEING USED, OR HAS THE POTENTIAL FOR USE, AS A DRINKING WATER SOURCE.	CHEMICAL
OH10 E	3748-81-24	A-E	ORGANIC CONTAMINANT MONITORING REQUIREMENTS	Presents monitornig requirements for organic contaminants.	PERTAUS TO ANY SITE WHICH HAS CONTAMINATED GROUND OR SUIUFACE WATER THAT IS EITHER BEING USED, OR HAS THE POTENTIAL FOR USE, AS A DRINKING WATER SOURCE	CHEMICAL
FROM: C	3745-81-27	A-E	ANALYTICAL TECHNIQUES	PRESENTS DENERAL ANALYTICAL TECHNIQUES FOR NACLS.	PERTARIS TO ANY SITE WHICH HAS CONTAMINATED GROUND OR SURFACE WATER THAT IS EITHER BEIND USED, DA HAS THE POTENTIAL FOR HISE, AS A URINKIND WATER SOURCE.	CHEANCAL
3 55 1	3746 81-40	A,B,C	regularements for a variance from MCLS	PROVIDES CRITERIA BY WHICH DIRECTOR MAY GRANT VARIANCE FROM MCLS	PERTAINS TO ANY SITE WHICH HAS CONTAMINATED GROUND OR SUMPACE WATER THAT IS EITHER BEING USED, OR HAS THE POTENTIAL FOR USE, AS A DRINKING WATER SOURCE.	CHEMICAL
4-98 1	3745-81-48		ALTERNATIVE TREATMENT TECHNIQUE VARIANCE	ALLOWS FOR THE USE OF ALTERNATIVE TREATMENT TECHNIQUES TO ATTAIN MCLS.	PERTAMS TO ANY SITE WHICH HAS CONTAMINATED GROUND OR SURFACE WATER THAT IS EITHER BEING USED, OR HAS THE HIDENTIAL FOR LISE, AS A DRINKING WATER SOURCE	CHEMICAL
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### OHO ADMINISTRATIVE CODE IC SANDUSKY COUNTY GREINER'S LAGOON

PACE	ADMINIS. CODE SECTION	PERTINENT PARAGRAPH	TITLE OR SUBJECT OF REGMATION	DESCRIPTION OF REQUIATION	APPLICATION OF REGULATION	AMAN 1 ype
	3745 81 80	A.D.C	SANIFARY SURVEYS	SAINTARY SURVEY RECRIBEMENTS FOR LIVES WINCIEDO NOT COLLECT FIVE OR MORE IDDITAIL TOTAL COLNEGMA SAINFLES PER MUNTEI	POREAMS ED ANY SIZE WIRCH IZAS CONTAMINATED GROWN DR SIRPACE WATER THAT IS SITUEN BEING USED OR HAS THE POTENTIAL FOR USE AS CHINKING WATER SOURCE	CHEMICAL
ø	3746 #1 71	A.8	GEN REQ FOR FRITRATION & CHARREST FOR SUM ACE WATER	FREATMENT STANDARDS FOR GIARDIA LAMBLIA, VININES, IN ISNOTROPHIC PLATS COUNT NACTEMA, LEGIOUPLLA TURBINI Y	PERTAINS TO ANY SITE WHICH HAS CONTAINNATED SURFACE WATER THAT IS ESTIMEN BEING USED, OR HAS THIS POTENTIAL FOR USE, AS A GRINKING WATER SOUNCE	ACTION CHEMICAL
64-314	3746-01-72	A,Ø	DISINFECTION OF WATER FROM SURFACE WATER SOUNCES	DISIMPECTRINI NEGLINALMENTS AND THEATMENT OF SUM ACE WATER	PERTING TO ANY GITE WHICH HAS CONTAINNATED BURFACE WATER THAT IS ETHER BEING USED, OR HAS THE POTENTIAL FOR USE, AS A DRINKING WATER SOURCE	ACTRIM CHEME.AL
8:4-6	3746 91 73	A B.C	PR THATION OF WATER FROM SUMFACE WATER SOUNCES	CONVENTIONAL IN THANNIE, \$LOW SAND FRANKTION, ON OTHER FRANKTION ON ATMENT IN BURFACE WASHI	PERFAME TO ANY SITE WINCH HAS CONTAMINATED SURFACE WATER MAT IS STIMB BEING LISTD, OR HAS THE POTENTIAL FOR 1128, AS A DIBBRING WATER SOUNCE	ACTION
Ω.	3746 81 74	A D	TURNITY AIRL DISINFECTION IACHIT NEG. FOR SLINPACE WATER	TURBIDITY AND DISHIF COTION MONITORING REQUIREMENTS FOR SUM ACS WATER SYSTEMS	PERTANNETO ANY BITE WONCH NAS CONTAMINATED SURFACE WALLE THAT IS STREET BEING USED ON HAS THE POTENTIAL FOR USE, AS A DIMINING WATER SOURCE	ACTION
	3748 9 04	А,В	LOCATION/SIEMG OF NEW GW WELLS	MAMDATES THAT GROUND WATCH WILLS BY ALCOCATED AND MAINTAMEN SO AS TO PREVINE CONCAMINANTS FROM ENTERING WILL BUL OCATED SO AS TO BE ACCESSIBLE FOR CLEANING AND MAINTENANCE	PENTAMS TO: LE GROUND WATER WELLS ON THE SITE THAT EITHER WILL BE INSTALLED ON HAVE BEEN INSTALLED SINCE PER 16, 1975. WOULD PENTARI DURING THE PS IP NEW WILLS ARE CUNSTINUCISE FOR THEATABBITY STUDIES.	LOCATION ACTION
DERR	1146 9 96	A1.835	CONSTRUCTION OF NEW OW WELLS	SPECIFIES MIRIMULA CORSTRUCTION IN COMBENIENTS FOR DEW GROUND YEATER WESTS IN REGARDS TO CASDIO NATEURAL, CASDIG DEPTH. POTABLE LYATSU, AND IN ART SPACES, USE OF DRIVE SUICE, OPENHIOR TO ALLOW YEATER ENTRY.	PERTAINE TO ALL DROUND WATER WELLS ON THE SITE THAT EITHER WILL BE INSTALLED ON HAVE BEEN INSTALLED BUILD FEB TAIL DURING THE FB IP NEW WELLS ARE CONSTRUCTED FOR THEATABLITY STIMMS	ACTION
O EPA :	374 <b>6 9 U0</b>	/ W.D.E	MEIT 2 CYBHIO BEONNEMBNIB EUN MEAN OAN	ESTABLISMES BEECHIC HEQUIREMENTS FON WELL CARHOS, SUCH AS SUNTABLE MATERIAL, DIAMETERS AND CONDITION	PERTAINS TO ALL GROUND WATER WELLS ON THE SITE THAT STITLE II WILL BE INSTALLED ON HAVE REEN HISTALLED BRICE FEB. 1870. WOLED DESTAIN DURING THE FB IF NEW WELLS ARE CONSTRUCTED FOR THE STABILITY BRUDHS.	AC TIQH
ROH OHI	3746 9 07	Al	SURFACE DESIGN OF HEW DW WELLS	ESTABLISHES SPECIFIC SURFACE DESIGN REQUIREMENTS, STICH AS MEIGHT ADDVE GRIGURIO, WATE VEHTE, WELT PRIMITS, LEC	PERTAINS TO ALL GROUND WATER WELLS ON THE SITE THAT LITTEN WILL BE INSTALLED SINCE FEB. 18, 1076. WOIND PENTAIN DUMIND THE FS IP NEW WRITS ARE CONSTRUCTED FOR THEATABLIFY STIMMES.	ACTIOH
13 SG F	3746 8 08	A.C	START UP & OPERATION OF DW WELLS	REQUIRE LIBINFECTOR OF NEW WILLS AND USE OF POTABLE WATER FOR PRIMING PUAIPS.	FUITABLE TO ALL CHOUSE WATER WELLS ON THE SITS THAT LITHER WILL BE HISTALLED ON HAVE BEEN WISTARLED SHICE FEB. 18, 1618. WOULD PERTAIN CURING THE FS IS HEW WELLS ARE COMESHICTED FOR THE ATABLITY STURIS.	ACTION
(-14-98	3746 8-09	A-C,D1,E-G	MANIFENANCE & OPERATION OF DW WELLS	ESTABLISHES SPECIFIC MAINTENANCE AND MODIFICATION REQUIREMENTS FOR CASING, PUMP AND WELLS IN GENERAL.	PERTAINS TO ALL GROUND WATER WELLS ON THE SITE THAT LITTIES WILL BE INSTALLED SINCE FEB. 16, 1976, WOULD PERTAIN DURING THE FEB. 184W WELLS ARE CONSTRUCTED FOR TREATABILITY STUDIES.	ACTION

PAGE

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ADMINIS.

CODE

SECTION 3746-9-10

OHIO MINISTRATIVE CODE (C GREINER'S BOON

TITLE OR SUBJECT

OF REGULATION

ABANDONMENT OF TEST HOLES & OW

WELLS

DESCRIPTION

OF REGULATION

SANDUSKY OF ATY

TY .	<u>)                                    </u>	
APPLICATION OF REGULATION	ARAR TYPE	
PERTAINS TO ALL GROUND WATER WELLS ON THE SITE THAT EITHER WILL BE INSTALLED OR HAVE BEEN HISTALLED SINCE FED. 15, 1975.	ACTION	

USE OF WELLS FOR DISPOSAL 3/45-9-11

/ ERTINENT

**PARAGRAFH** 

A,B,C

NO PERSON SHALL USE ANY WELL TO INJECT OR REINJECT ANY SUBSTANCE HITO THE GROUND WITHOUT NECESSARY PERMITS.

MAINTAINED IN COMPLIANCE OF ALL REGULATIONS.

FOLLOWING COMPLETION OF USE, WELLS AND TEST HOLES SHALL BE

COMPLETELY FILLED WITH GROUT ON SIMILAR MATLRIAL OR SHALL BE

MAY PERTAIN TO SYSTEMS THAT ENTAIL PIJECTION OF REIR JECTION OF FLUID INTO THE GROUND. CONSIDER FOR IN-SITU BIOREMEDIATION, SOIL FLUSHING AND GROUND WATER PLUME CONTAINMENT.

**ACTION** 

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DERR FROM: OHIO EPA 56